

Vol. VI

JANUARY, 1894

NO. I

THE PRINCETON COLLEGE BULLETIN



A QUARTERLY RECORD EDITED BY
THE PRESIDENT AND MEMBERS OF THE FACULTY

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The BULLETIN is a quarterly publication. The yearly subscription is \$1

Subscriptions should be sent to the Princeton College Bulletin, P. O. Box 608, Princeton N. J.



PRINCETON EXHIBIT AT THE WORLD'S FAIR.

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No. 1.

PRINCETON AT THE WORLD'S FAIR.

The illustrations which accompany this number of the BULLETIN give two views of the College exhibit at the Columbian Exhibition. They were taken from the central aisle of the gallery, and cover both portions of the space allotted to us.

The position given to the College was in the gallery at the south end of the Liberal Arts Building, immediately over its main central aisle. Harvard University was located upon one side of us and Columbia College on the other.

We had at our disposal 2000 feet of floor space, and about 1500 square feet of wall surface. The whole space was divided into two portions by the aisle of the gallery. The partition wall surrounding the space was ten feet high, and was covered with canton flannel of a deep maroon color, which served as a background for the pictures. The floor within the two main portions was covered with a Brussels carpet. No pains or expense were spared to make the exhibit complete and attractive.

The background of the southern space was occupied by a bookcase extending across the whole width of our section (38 ft.). This case was about four feet high and contained a collection of books aggregating some 3000 volumes; the works of the alumni and of members of the Fac-

ulty; the series of the college annuals; memorabilia etc., etc. Above the bookcase was a series of oil paintings; in the centre of the line was the large picture of Washington painted by C. W. Peale in 1784; which for a century had hung undisturbed in North College. This picture was handsomely draped with an American flag. On either side of this painting were arranged the portraits of our ten distinguished deceased Presidents, from Dickinson to Maclean. On the side walls of this space, facing one another, were two handsome crayons of Ex-President McCosh and President Patton. On the same walls, one on each side, were the portraits of our two Revolutionary Governors, Belcher and Patterson. The remainder of this wall space was occupied by pictures of the College grounds and buildings. Thirty large platinotypes illustrating all the College buildings were prepared especially for this purpose; and among them was placed a collection of architects' colored sketches of some of the buildings.

In the centre of this space, was the model of the College grounds. This was a large relief-map showing each building, terrace and tree upon the Campus. It measured eight by six feet, and being upon a good scale showed the arrangement of our grounds very perfectly, forming an attractive feature of the exhibit.

Upon two easels, one on either side of this model, were placed a number of interesting College curios. Among them were, the two oldest catalogues known to be extant. These were the broadsides of 1805 and 1818; a commencement programme of 1760 in Latin; a series of old diplomas containing nearly all the signatures of the former Presidents of the College; Prof. Guyot's manuscript map of the distribution of the erratic boulders of Switzerland (1849); and an original manuscript Physical Map of the World by Carl Ritter (Berlin 1806). On one of the easels were the photographs of the various members of the Faculty.

In front of the bookcase and around the model at a distance of two feet there was a nickel plated hand-rail.

The other space had but two side walls; it was however closed upon the side towards the edge of the gallery by a handsome arch of open grill-work, which bore the legend "PRINCETON COLLEGE, 1746," upon both sides. It was draped in orange and black, and at its centre supported the arms of the College (taken from its seal) surrounded by a group of national and college flags. The effect of the arch was very striking, and it was almost impossible for anyone to pass through the main aisle of the great building without seeing it, as it was the most prominent object in the gallery.

Upon one of the side walls of this space were placed the exhibits from the departments of Civil Engineering and Graphics. The other side wall was devoted to the student organizations; the halls; literary magazines; religious societies; foot-ball, base-ball, lacrosse, and gymnastic teams, etc., etc.

Under the arch was a long table case which contained a series of literary treasures from the Library, also specimens

from the Museum of Historic Art, consisting of samples of engravings, photographs, slides, and specimens from the Trumbull-Prime collection of pottery. Across the open space next to the aisle was another table case, containing the apparatus of Prof. Henry and an exhibit from the Department of Physical Geography. The first being the world-renowned set of instruments by means of which Prof. Henry's discoveries in electricity were made. The other set consisted of a historic collection of instruments, some of them unique and others valuable for their associations. Among them were Humboldt's Magnetometer, an original Fahrenheit thermometer (Amsterdam 1632), thermometers and barometers used by Agassiz and Guyot in their Swiss glacial work, etc., etc.

In the open space between the walls and the table cases were two tall cases and the secretaries' desk. One case contained the exhibit of the E. M. Museum of Geology and consisted of rare and in many instances unique specimens from each of the Geological epochs. There were also casts of some of the more valuable things in the Museum which could not be sent. The other case contained a collection of mounted birds representing the Atlantic coast series, from the Biological Museum of the John C. Green School of Science.

The Rittenhouse Orrery (1770), was placed upon a platform by itself; and Franklin's electrical machine and Prof. Henry's great magnet were placed near the end of the table case containing the rest of his apparatus. Under the Engineering and Graphics exhibit were some construction models, and upon a table were albums containing work from the Department of Graphics.

Without going further into detail this statement will show that the exhibit was

intended to cover the history, the activity and the scope of the institution. That it accomplished this object, can be inferred from the many favorable comments which have been made upon it not only by the alumni but also by strangers.

The exhibit was under the charge of Mr. Street, '92. He was well supplied with

catalogues, directories, and also with a hand-book which was prepared for free distribution, with the purpose of giving concise information upon the history of the College, its buildings, its organization and its course of study. Four bronze medals were awarded the College for the exhibit.

SUMMARIES OF PAPERS READ BEFORE SCIENTIFIC SOCIETIES.

THE PHILOSOPHY OF ART.

By A. L. FROTHINGHAM, Senior.

The Personality of Art.—Art is organized as a personality of spirit, soul, body, analogous to the personality of man. The spirit of art is constituted by the Philosophic or Social arts, which are Philosophy, Religion, Government; its soul, by the Literary arts or arts of Expression (Language, Poetry, Music); its body, by the Formative arts or arts of Design (Architecture, Sculpture, Painting). In the normal manifestation of this personality, the social govern the literary and formative arts, furnishing them with general principles and ideal subjects for incorporation. The general ideal of every historic period appears first in the social arts, passes into the literary and formative arts, finding expression in the greatest variety of forms which appeal to the entire organization of the mind. This coöperation of the arts extends from Philosophy to Painting, and their comparative study under the light of analogy is one of the most fruitful sources of knowledge as to the ideal significance of the lower arts; for it is in the higher arts, where thought is expressed in language, that we find the clearest presentation of the psychologic principles and sociologic ideals which govern all original

production in any given epoch, all that constitutes its creative work of inspiration and genius, as distinct from mere fantasy, reproduction, and imitation.

The Place of Art in Civilization.—Civilization personifies human experience in the tri-individuality of Art, Science, and Industry, which constitute the spirit, soul, body of civilization, and cover the whole ground of man's intelligent production and occupation. Art, as the spirit of civilization, is the highest agent in the development of human consciousness, activity, life: it is either regenerative or degenerative, as it is the exponent of Truth-Good-Beauty, or of Falsehood-Evil-Deformity. In every historic period, art incorporates the dominant universal ideal in the inter-related arts from Philosophy (the highest) to Painting (the lowest), thus causing this ideal to circulate throughout the social fabric as a productive agent.

Art occupies that department of human thought and activity which relates to the discovery of the ideality of existence and the laws of the mental universe, and to the incorporation of this knowledge in sensible forms for the sake of the ideal principles which these forms signify and contain, and for the purpose of communicating these ideal principles to man for use in his mental life and development, and in his relations with other minds.

Art is thus distinguished (1) from Science, which investigates the physical universe in the acquisition of knowledge for practical use in the subjection of nature to man; (2) from Industry, which works for the sake of material utility, and as the means of livelihood, in the cultivation, organization, and distribution of the products of the material universe.

Art and Nature.—Art is a product of man's creative intelligence, not an imitation or copy of Nature: the latter view would take from art all reason to exist, would ignore all genius or creative power, and render impossible all progress in the race. Concrete nature presents the mixture and conflict of opposites, and it is one of the most important functions of art to correct the deceptive and confused appearances of nature by giving individuality to the opposite principles which are behind the sensible appearances, and to use them in the representation of the ideals of the mind. In every work of art, from landscape-painting to Philosophy, nature is used as material, but only as it is transformed into artistic unity with the ideal in the mind of the artist, which is the primary ground and cause of the work of art; and the art consists in the reality of this incorporation of the ideal in actual form so as to express it by means the most clear, simple and direct; whether it be an ideal of beauty or of deformity.

Missions of Art.—Art has three missions: it is historic, interpretative, creative. As historic, it preserves the essential manifestations of humanity in all spheres of ideal experience; as interpretative, it makes clear the ideal significance of human realization; as creative, it conceives and presents the unactualized ideal possibilities of human nature under three different kinds of artistic power, represented (1) by the fictitious and ephemeral ideality of the

man of Talent and Fancy; (2) by the intuitive insight and real ideality of the man of Genius and Imagination; (3) by the prophetic insight and analogic symbolism of the man of Inspiration in the synthesis of Reason, Sentiment and Imagination.

Art Ideals.—Human thought, including art, has four permanent universal ideals and intellectual standpoints, which are founded on different conceptions of primordial causality, being and efficiency. These are the theistic-supernatural, the natural, the material, the nihilistic-supernatural ideals, which respectively posit the Personal God, Nature, Matter, and the Impersonal Nothing. These ideals must always persist and always conflict: they are the Extreme-Right (the constructive-conservative), the Right-Centre (the conservative-liberal), the Left-Centre (the radical-liberal), the Extreme-Left (the destructive-radical). The Conservative and the Radical are the opposite poles of the universe of consciousness and thought, the two centres being merely half-way positions on the way from dormant or diseased constructive root-principles to those which are radically destructive, and represent destructive progress. Every art must present these four types in the course of its history, as it passes from constructive to destructive ideals. True progress can be realized only through a revivification of conservative principles and the constructive ideal. It is the ideal of Truth-Good-Beauty that constructs civilization: the ideal of Falsehood-Evil-Deformity disintegrates and would destroy it.

The Philosophy of Art.—Æsthetic Science is the philosophy of truth-good-beauty and falsehood-evil-deformity. It should teach us concerning the ontologic archetypes of these principles in objective being, and their psychologic types in the human mind; an adequate and practical

science of mind being indispensable to the study of art on its subjective side.

Æsthetic science must teach us to separate the generic principles of artistic reality into their opposite spheres of ideal causality, placing on the one side the correlative and coöperative principles of *constructive* ideality, which are Sublimity, Beauty, the Picturesque; and placing on the opposite side the correlative and coöperative principles of *destructive* ideality, which are the Horrible, Deformity, the Grotesque (including the Comic).

The chief obstacle to modern æsthetic science is that it has been founded on a Monistic philosophy, and therefore recognizes Beauty to be the only art-principle. It is not science to say that art is the representation of beauty alone, for real art is often the representation of deformity, death, and disorder, depravity and hate, the artistic quality consisting in the reality of the representation of these ideas that are opposite to Beauty, which includes life and order, purity and love.

It is not scientific, but chaotic, to say (with German theorists) that the sublime and the horrible, the beautiful and the ugly, the picturesque and the grotesque or ridiculous are momenta of a pseudo-beauty, for these opposites cannot be defined under any one of these terms, but only under some general term, such as *reality*, *art*, *etc.* This identification of the horrible, deformity, and the ludicrous with beauty is made, not from a superficial inconsistency, but in the interest of a false idealism, which aims to identify opposites in the principle of universal negativity, according to which everything involves and evolves its opposite and negates itself in becoming its opposite, and existence forms an endless chain of negations.

Æsthetic science must also present laws of classification and of historic develop-

ment of art which shall be a guide in the comparative study of its opposite generic ideals and its distinct specific ideals, of its particular examples, its schools, and its historic periods; recognizing the validity of every species of art that persistently reproduces its kind, and is therefore to be included in the natural history of art. The monistic law of continuity of one generic ideal fails to explain the history of these opposite and conflicting types.

The Philosophy of Art should conceive the different art-ideals, present their distinctive character, and estimate their relative value according to a universal ideal standard. It must reach the heights above these contending ideals, and show the natural relation and succession of these types of thought in the order of human society. It is only by this means that thought can be redeemed from the chaos of contending ideals, from the limitations and deceptive judgments of individual opinion and preference, from the instability of an everchanging free-thought or pseudo-rationalism, and from the seductive gratification of free-feeling or licentiousness which is associated with it.

Practical Use of the Philosophy of Art.—The Philosophy of Art is not in the interest of theoretic truth alone, but is also a practical guide in all affairs of life. I. It furnishes a basis for historic judgment of the social principles at work in all periods of civilization, it being impossible to interpret history without a knowledge of the ideal principles which are the psychologic causes in its production. II. It is necessary as a guide in the separation between opposite orders of art—between the art which is true and constructive, elevating and purifying, and the art which is false and destructive, depraving and corrupting. III. It aids to controvert the different forms of destructive thought: (1) the technic

school of sensual realism, whose motto is "art for art's sake;" and who would make art consist in perfection of technique, which is made to cover a multitude of sins in the ideal content; (2) it controverts the false gospel of the pessimistic and nihilistic-supernatural ideal, which is the destructive factor in civilization; (3) it controverts the current pantheistic, naturalistic, and material theories of philosophy and religion and politics; especially the claims of the critical, logical and pseudo-rational intellect in its assertion of the natural ideal, and the claims of the realistic and technic intellect in its assertion of the material ideal; both of which combine with the destructive-supernatural ideal in a common enmity to Christian Theism and the constructive-supernatural ideal of Christian Civilization.

[Summary of a paper read before the PHILOSOPHICAL CLUB, November 13, 1895.]

THE LAMBETH ARTICLES OF CHURCH UNITY.

By CHARLES W. SHIELDS.

The Parliament of Religions, while exhibiting the supremacy of Christianity, has also exposed the weakness of its internal divisions and made the re-union of Christendom more than ever necessary to the conquest of heathenism as well as the maintenance of civilization.

Church unity should be distinguished from Christian unity, which is a condition precedent to it; from the federation of denominations, which is only a first step toward it; and from the assimilation of denominations, which is not involved in it. It will demand variety in unity as well as unity in variety. It should also be vindicated against a false ecclesiasticism, on the one hand, and against a false denominationalism on the other.

In the face of much scepticism church unity is made feasible: (1) By the analogy of living nature, which shows increasing compactness with increasing complexity through the organic scale, from the mollusc up to man; (2) By the analogy of political society, which has produced the United States out of the most diverse climates, nationalities, institutions and religions; (3) By the example of early Christian society, which comprised differences in doctrine, polity and ritual within one Apostolic Church; and (4) by the tendencies of all Christian denominations to become national and comprehensive in some ideal American church.

The failure of former efforts for church unity has been due to causes which are dying out in our age and country. Geographical and national barriers have disappeared and doctrinal barriers are disappearing. Social influences are unifying Protestant bodies, and democratic influences are unifying Catholicism with Protestantism. Never before in any Christian century, nowhere else in any Christian country, have all the conditions been so favorable for recovering the long-lost ideal of one Catholic Apostolic Church.

There are two practical requirements: the scope of church unity should include both the historic and reformed churches; and its basis should be their actual consensus on doctrine, polity and worship. These requirements are fully met by the Chicago-Lambeth proposals; the four articles of unity, known as the Scriptures, the Creeds, the Sacraments, and the Historic Episcopate. The first three of these articles are already held virtually by both the historic and the reformed churches. The fourth, the historic episcopate, is not peculiar to the denomination known as the "Protestant Episcopal Church," but is common to the Greek, Latin and Angli-

can Churches, and is adaptable to Congregationalists and Presbyterians as well as to Episcopalians of every type.

The unifying value of the Historic Episcopate may be shown by various considerations. First: It is the *de facto* government of four-fifths of Christendom, and without it there can be no actual re-union. Second: It bases church unity upon church polity; not upon systematic theology, which can never afford a basis for denominational unity. Third: It embraces the congregational and presbyterian polity in organic connection with the episcopal, and thus insures all denominational rights and liberties. Fourth: Neither enjoining nor forbidding a doctrine of apostolical succession, it tolerates all types of churchmanship and may be accepted, as it is maintained, on a presbyterian no less than a prelatic theory of its origin and merits. Fifth: Its exclusion of non-episcopal ministries, though otherwise deemed opprobrious, tends in fact to harmonize denominational variety with church unity. Sixth: It is the source and guarantee of the other articles of church unity—the Scriptures, the Creeds and the Sacraments. Seventh: It is the only method by which Episcopal, Presbyterial and Congregational denominations can return to the organic unity of the Apostolic Church.

Two modes of unification on the basis of the Lambeth articles have been proposed: Confederation and Consolidation. There is a third method of organic growth, which would avoid the evil and retain the good of the other two methods. It would begin with the organic re-union of presbytery and episcopacy in all denominations, with the view of compacting the reformed churches against sectarianism and infidelity; and it would have its ideal fulfilment in an ultimate re-union of the Protestant and Catholic bodies in one United Church of the United States.

The reaction of the denominations toward church unity since the Reformation must be measured by the march of generations through centuries. If it be not yet apparent in the logic of events, it is made inevitable by the logic of tendencies; such as the decline of the polemic spirit, the decay of the denominational spirit, the revival of the ecclesiastical spirit, together with a popular desire for unity which is becoming passionate and irresistible. All Christian denominations are entering a campaign of education.

[Substance of a paper read before assemblies representing all Christian denominations in the cities of New York, Boston, Philadelphia, Baltimore and Washington.]

“GIACOMO LEOPARDI, HIS LIFE AND WORKS.”

By ALEXANDER W. HERDLER.

Leopardi's most striking characteristic is an extreme subjectivity. In this respect he even surpasses Byron, who gave, indeed, free course to his own aspirations and passions, but felt at the same time sympathy for human sufferings, and expressed in ringing words his burning thirst for justice. Leopardi's feelings move in a narrow circle; he cares but little for his country, still less for humanity; it is with his own life alone that he concerns himself. Aesthetic sentiment ruled his thought, and he was endowed with a critical mind that was bent on investigation. By an inner necessity he was compelled to analyze all his impressions, and we can understand why he commenced his literary career, not with verses, as do most poets, but with philological work. Excessive work exhausted his feeble system and destroyed his health forever. Harassed by unceasing physical pain, and even more by the sad circumstances of his home life, the poet becomes steadily more melan-

choly and pessimistic. His letters to Giordani express most strongly his desolation. They are a series of complaints over his broken health and his forced inactivity. A mortal ennui and bitter feeling of complete isolation in the midst of his family take possession of him, and he hurls himself into a complete pessimism.

He generalizes his own sufferings in attributing them to the whole world. Life he considers an evil; virtue, happiness, love—illusions. Nevertheless, man cannot be happy unless he believes in these illusions. The poet himself has lost this belief, but he wishes it cultivated in the human heart, for the pleasures that flow from it may serve as a basis of morality. Under the influence of this idea, the poet declares in one of his letters that only good men can be happy, for these alone are capable of grand and beautiful illusions. In short, “questo mondo è un nulla e tutto il bello consiste nelle care illusioni.” This was the last word of Leopardi’s philosophy. His verse between 1814 and 1826 is the fruit of this system of thought. Since patriotism is one of the most beautiful illusions, Leopardi devotes to it a few poems, among which the “Canzone ad Angelo Mai” is the most eloquent. However, the patriotic sentiments do not come from the bottom of his heart; their ephemeral existence is due to Giordani’s influence over him. The poet is aware of this, and soon he abandons them. Religious sentiments had no access to his soul, even in his earliest life. Consequently his only refuge from an overwhelming melancholy is in dreaming of death (*L’infinito*, *La vita solitaria*), or of love. But since the latter is also an illusion, the poet arms himself against these deceptions by creating, like Rousseau, an ideal sweetheart, whom he worships in the ode, “Alla sua donna.” This philosophy

would not, however, take lasting possession of the poet’s spirit; his common sense forbade him to seek consolation in illusions which vanish before the attacks of science. By degrees he arrives at the conviction that it is better, by a close and careful observation of the world and life, to build up a sound philosophy than to lament in vain over the cruel disillusionments of science. This change of tone appears already in “Al Conte Carlo Pepoli” (1828), in which Leopardi declares that, since the dreams of his youth have flown forever, he will devote himself to seeking the truth, which, “although sad, yet has its charms.” Yet at first sight these researches do not lead Leopardi to any new result. In his philosophical essays he considers the earth nothing more than a mote in the immense universe. Blind nature has by no means created us to be happy; death is the sole purpose of all existence, and men are wicked by nature. It is therefore useless to combat evil; there remains for a consolation nothing but the calm of dreams or death. Leopardi seems to move in the same ideas as before, but he plunges more and more into the contemplation of the mysteries of pain and death, whilst illusions and dreams continue to lose their former charm for him. His work from 1826–1837 gives a striking proof of this. “Il Risorgimento” expresses still the same sentiments as the ode, “Alla sua donna,” but “La quiete dopo la tempesta,” “Il sabato del villaggio,” and the “Canto notturno di un pastore errante nell’Asia,” are filled with a sadness without consolation or hope. The desire for annihilation betrays itself most visibly in the following poems: “Gonzalvo,” “Aspasia,” “A sè stesso,” “Amore e morte,” “Il pensiero dominante.” The essential feature of this new stage of the poet’s thought consists in the idea of the brotherhood of love and

death. Love is the most intense of our sentiments, for it concentrates in itself all our aspirations and dreams of happiness. But the very fact that its pains far outweigh its pleasures, make love our great benefactor, for through the pain of love we learn at last that the greatest efforts of our soul result only in the greatest suffering. This immense pain turns us away from the delusive pleasures of life, frees us from the yoke of desires, and fills us with the desire of death, till we find in the intoxication of this yearning the sole remedy for all the evils of existence.

Leopardi's inspiration attains its climax in "Il pensiero dominante," and this thought is not a dream of angelic beauty, as is claimed by Leopardi's commentators, but precisely the idea of the indestructible union of love and death; an idea which causes the poet the delight of agony — *la gentilezza del morir*. In this manner Leopardi, who had commenced by an utter despair, surrenders himself in the later years of his life to Buddhistic dreams, which gave him a peace that he had never before experienced.

[Summary of a paper read before the MODERN LANGUAGE ASSOCIATION of America, at Washington, D. C., December 27, 1893.]

FAUST AND THE CLEMENTINE RECOGNITIONS.

BY ERNEST C. RICHARDSON.

August 20, 1507, Trithemius of Spanheim, wrote to Johann Wirdung, Court Astrologer to the Elector Palatine, concerning one Magister Georgius Sabellicus, Faustus Junior, "fons necromanticorum, astrologus, magus secundus, chiromanticus, agromanticus, pyromanticus, in hydra arte secundus." The Faustus Junior, who appears here for the first time, is the historical starting point of the familiar Faust

story. In the succeeding years allusions to him are numerous. Mutianus Rufus, Melanchthon and perhaps Luther, Camerarius, Begardi, Gast, Gesner, Wier, Bullinger and Lercheimer are among the many who knew Faust or knew of him. From all this testimony it appears that the historical Faust flourished from 1505 until about 1540 and was of great reputation as a magician. After his death tales of other magicians gravitated to his name and in 1587 all these tales were collected in the famous Faust-book. In less than five years the book had spread all over Northern Europe. Editions multiplied, and translations were at once made into Low German, Dutch, Flemish, Danish, English, French and Lithuanian at least, and these were followed by redactions and transformations innumerable. Among the common people it held a remarkable popularity and as a theme for literature, music and art it was welcomed from the very beginning. Marlow's Faustus appeared shortly after the Faust-book itself and since his time, Lessing, Heine and above all Goethe, through literature, Henry Irving through his acting of Wills' version, Rembrandt, Jost Amman and Ary Scheffer in art, Radziwill, Spohr, Berlioz and Gounod in music have maintained the tradition of the perennial popularity of the Faust story.

The whole story is one to delight the student of comparative literature in the variety of its problems, but the problem of the origin of the name is one of peculiar interest, from the fact that it touches the very historic beginning, and the fact also that the name is almost the only unchanging factor in the history of the story.

The Faust of 1505-7 called himself Faustus Junior. Who then was Faustus Senior? Fust, the printer, Faustus, the Manichean, Faustus Andrelinus, Faustus

Socinus, Faustus of Byzantium have been proposed.* The discussion of these theories shows that to mere suitability of name must be added a probability that Faustus knew about the Faustus proposed as Senior.

Now Sabellius called himself not only Faustus Junior but Magus secundus or the second Simon Magus. In the Clementine Recognitions, Faustus brother of Clement is a pupil of Simon Magus. This has been noted before and the relation to the Faust story explained by the great popularity of the Recognitions during the Middle ages as proved by the fact that Legarde mentions fifteen MSS. as known to him. Now there are nearly an hundred MSS. known to the writer of this paper. Moreover the first printed edition had been published (1503) just before the appearance of Faustus Junior. Still farther the story quoted from the Recognitions, is in the Golden Legend of Voragine of which more than 300 MSS. are extant, and of the printed editions of which the writer has gathered a list of *one hundred and thirty* printed during the thirty years before Faustus Junior appeared. Faust and Simon Magus were household words in the time of the historic Faust.

With this clue there is to be found in the Recognitions the origin of "pyromanticus," "agromanticus" and various other titles, so that Faustus, joined with Simon Magus and known both to Faustus Junior and to the people whom he addressed, is confirmed as the original Faustus whose name Sabellius borrowed as a title.

[Abstract of paper read before the AMERICAN SOCIETY OF CHURCH HISTORY in New York, December, 1893.

[*NOTE.—These theories are discussed at length in the paper.]

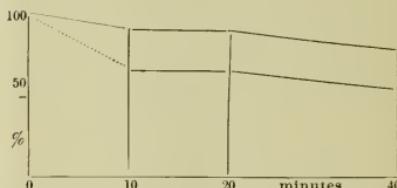
MEMORY FOR SQUARES.

By HOWARD C. WARREN.

Experiments were made in Toronto by Prof. Baldwin, with the assistance of Mr. W. J. Shaw, to determine the accuracy of memory for visual magnitudes. I give the results of these, with supplementary experiments by Mr. Shaw and myself at Princeton.

The objects of experiment were squares, the intervals ten, twenty and forty minutes. A class of 225 persons (fifty being women) made the observations simultaneously. The methods employed were: 1. SELECTION. A square was shown and removed; after the desired interval a number of squares were shown together; to select a square equal to the first. 2. IDENTIFICATION. A square was shown and after an interval another; to determine whether the latter was larger, equal, or smaller. The percentage of right cases was as follows:

	Selection.	Identification.
10 min.,	65.1	87.6
20 "	59.3	82.7
40 "	36.4	58.5



The curves are nearly parallel. That they do not coincide is due to two causes: (1) If a subject always, by Selection, choose too large a square, then, by Identification, given a larger followed by a smaller, he would always answer correctly; so there would be relatively a larger number of correct answers by Identification; similarly for other cases. (2) Special experi-

ments proved that when several squares are shewn together, contrast leads to the choice of one *nearer the average of the set* than the correct one. These facts showed the superiority of Identification. More exhaustive than the determination of Right and Wrong Cases is the determination of the "Threshold Value" for perceptible change in magnitude, for each time-interval, *i. e.*, that difference which just 50 per cent. detect. This can also embrace perception, considered as zero interval. Experiments (not yet completed) are being made to determine these threshold values. To avoid unnecessary labor, the differences are chosen tentatively, being determined each time by the results of the preceding trials. The normal square was always 150 mm. length of side. The threshold value increased with the length of time; but it was found that smaller differences could be detected when the second square was smaller than when it was larger; that is, *the memory-image tends to become greater* than its original. Taking the mean of the two results and reducing to per cent. of areal difference, we find the threshold to be 4 per cent. for no minutes; 9 for 10; 13 for 20, and 18 for 40, approximately.

A theory will be elaborated elsewhere connecting the general uncertainty of judgment with clearness of outline—*i. e.*, contrast between the object in question and its "background." This appears to diminish with the lapse of time.—The exaggerated tendency may be explained in part as follows: The amount of under or over-estimation is not absolute, but depends on the size of the squares; if Weber's Law held absolutely, it would vary proportionally to the size. Hence a larger square, to be judged correctly, must differ from the normal by more than a smaller square; and if the judgment oscillates between the threshold limits, the mean value would be larger than the normal square. Even assuming Weber's Law to hold (the extreme case), the amount of this divergence is inappreciable,—for a threshold 1 per cent. of the normal, it is but .001 per cent., for 10 per cent., .12, etc. Some other more potent factor is needed to account for the degree of displacement actually observed. This point requires careful investigation.

[Abstract of paper read before the AMERICAN PSYCHOLOGICAL ASSOCIATION, Dec. 27, 1893.]

SUMMARIES OF PAPERS PUBLISHED.

THEORY OF HERMITE'S FORM OF LAMÉ'S EQUATION.

By J. BRACE CHITTENDEN.

The above gives the title of Dr. Chittenden's inaugural dissertation on taking his degree under the guidance of Professor F. Lindemann at Königsberg in Prussia. Since the publication by Todhunter, 1875, of his work entitled "Lamé's and Bessel's Functions," the few pages in the latter

portion of this book have constituted the sum total of our available literature with respect to a problem that, owing to the labors of M. Hermite, was completely solved as early as 1877. The problem, namely, to find the general solution of Lamé's differential equation without placing any restrictions as to the constants involved, affords as now presented an admirable illustration of the practical application of the elliptic functions. This fact is emphasized in the work before us by the use

throughout of the Weierstrass (*p.*) function. After a sketch of the history of the subject from the development of the potential functions by Lagrange and a statement of the original problem of Lamé, the author works out the solution of M. Hermite first as a sum and then in the form of a product, finding meanwhile the explicit forms for the case where the constant (*n*) is taken equal to two, important results that afford a complete solution to the problem of the pendulum constrained to move upon a sphere. The next work was naturally to apply the general theory to the case *n* = 3, and in attempting to do so the author points out the apparently insurmountable difficulties that arise. These are allayed one by one and the foregoing theory greatly extended by a return to an investigation of the original functions of Lamé resulting finally in the determination of over one hundred and fifty forms that together afford the complete solution sought. All the conditions necessary for special solutions in form like the old doubly periodie functions of Lamé and also for the later ones of M. Mittag-Leffler, have been worked out in detail, and as a consequence the general result is a complete logical presentation of the theory of Lamé's functions fully exemplified.

Leipzig, B. G. Teubner, pp. 88.

**DR. BRIGGS' HIGHER CRITICISM OF
THE HEXATEUCH EXAMINED.**

By WILLIAM HENRY GREEN.

This article is devoted to a consideration of the recent volume of Dr. Briggs, entitled "The Higher Criticism of the Hexateuch," and a comparison of it with his article in the *Presbyterian Review* for January, 1883. The volume is, in large part, a reprint of this article, with such modifications as his change of attitude in

the interval has rendered necessary. His attempt to set aside the testimony of Scripture to the Mosaic authorship of the Pentateuch is first brought under review, and then the account which he gives of the several critical hypotheses which have arisen in succession, together with the grounds on which they severally rest. The manner in which the credibility of the Pentateuch is undermined and its historical truth, in even its most essential parts, impugned by the assumptions that lie at the basis of these critical hypotheses, is pointed out; also the extreme length to which Dr. B. has now gone in his acceptance of the revolutionary development hypothesis in its presuppositions, its method of argument, and its conclusions. This marks a very great and significant advance in his views in the last ten years. In 1883 he contended that the three Pentateuchal codes of law were of Mosaic origin; that the Book of the Covenant and Deuteronomy were written by Moses, and the Priest Code was delivered by God to Moses, and by Moses to the priests. Now he holds that not one of these can be attributed to Moses in its integrity. Of the Ten Commandments, the brief words of command with which they begin are Mosaic, but not the specifications and reasons which constitute the bulk of them in their present form; these are later additions by J, E and D. The Book of the Covenant (Ex. xxi-xxiii), which Moses is said to have written and read to the people, is not preserved in its original form, but has been subjected to "omissions, insertions, transpositions and revisions." What we possess is the "codification" of a later date current among the ten tribes. Deut. i-xi professes to be "the words which Moses spake unto all Israel beyond Jordan in the wilderness." But it is a post-Mosaic production, and the best that

can be said of it is "it is highly probable that there existed the tradition—perhaps even in a written form—of a final address delivered by Moses in the plains of Moab." The Deuteronomic Code (Deut. xii–xxvi), which is expressly said to have been written by Moses and delivered by him for safe preservation to the custody of the priests, to be kept by them in the sanctuary, is not what Moses wrote, but is a recodification of the Judaic recension of the old Covenant Code of Moses. The Priest Code, which is said in all its parts and enactments to have been directly given by God to Moses, is a codification, a thousand years after Moses, "of the priestly ritual and customs coming down by tradition from Moses and Aaron in the priestly circles of Jerusalem." A few simple ritual regulations, incapable of being definitely identified, are attributed to Moses; and these, in the long ages of temple practice, were expanded into the ceremonial law of the middle books of the Pentateuch. In the narrative portion the itinerary (Num. xxxiii. 1–49), and a single sentence in Ex. xvii. 14, are from Moses; no more.

[Abstract from an article in the *Presbyterian and Reformed Review* for October, 1893.]

IMITATION: A CHAPTER IN THE NATURAL HISTORY OF CONSCIOUSNESS.

BY J. MARK BALDWIN.

An attempt is made in this paper to bring under unity of conception the various observations reported by many writers on acts of imitation by infants, men, and animals. The formula is reached that imitation is a motor reaction of the 'suggestive' type which normally repeats its own stimulus and so provides for its own repetition. The utility of such a self-repeating type of reaction in biological evolution is enlarged upon and animal instinct and im-

pulse discussed in the light of it. The views of Eimer and Verworn are criticised at some length.

The varied phenomena of infant imitations are studied in the light of this formula, use being made of detailed observations published by the author in earlier papers (*Science* XVII, 1891, p. 113 and XIX, 1892, p. 15). 'Simple' is distinguished from 'persistent' imitation, the latter alone being considered voluntary, and indeed the first exercise of infant volition (in opposition to Preyer and others; this point has also been developed by the author in *Proc. Congress for Exp. Psych., London, 1892*).

The indications of the influence of imitation throughout the growth from childhood to manhood are traced. The doctrines of the rise of the notion of self (with criticism of the theory of *Introjection* of Ave-narius), of the rise of social feeling (with criticism of Tarde, Sighele, and Royce), and of the principles of identity and sufficient reason, are reviewed in the light of the growth of motor habit through progressive adaptation by imitative suggestion. The effort is made, furthermore, to found the theory of motor development upon the two principles of Habit and Accommodation; and to show that the latter rests fundamentally upon reactions of the imitative type.

Finally the whole series of phenomena of imitation are classified under three great heads, all illustrating the general formula of imitation already spoken of. These three 'kinds' of imitation are 'biological' (or organic), 'conscious' (the child's ordinary imitations), and 'plastic' (the social imitations, contagion of feeling, spread of example in mobs, and phenomena of collective psychology generally.)

[Abstract of an article in *Mind* (London), Jan., 1894.]

PHILOSOPHY: ITS RELATION TO LIFE
AND EDUCATION.

By J. MARK BALDWIN.

The influence of philosophy upon life is illustrated by a brief review of the various philosophical answers to the 'world-problem' and the 'problem of knowledge'; the first position taken being that philosophical problems are essentially 'problems of human life.'

The second point which it is aimed to establish is this: "Its effects on life are in a general way, and when historically interpreted, a legitimate test of the truth or falsity of a philosophical doctrine or system." This is argued both by an analysis of the claims of science to impose its principles upon philosophy, and by the attempt to reinstate inner experience as of equal worth with objective experience and as revealing equally a realm of reality. A criticism is made of the use of the so-called 'argument from consequences' as applied to systems of philosophy. It is pointed out that consequences are themselves parts of experience, and hence must enter as valid elements in the data upon which a metaphysics of experience must be based.

The third general position deals with the relation of philosophy to education and the place of philosophy in the university curriculum. Note is taken of the great differentiation of topics now necessary in instruction in philosophy, and Experimental-Psychology is recognized as a necessary adjunct to adequate equipment either of an institution of higher learning or of an instructor in philosophy.

The article closes with a brief sketch of the relation of philosophy, as a collegiate discipline, to Natural Science, Literature, and Political Theory.

[Abstract of an article in the *Presbyterian and Reformed Review*, Jan., 1894, pp. 30-48.]

INTERNAL SPEECH AND SONG.

By J. MARK BALDWIN.

An interesting field of exploration has in recent years been opened to us in the sphere of the psychology and physiology of speech. The results accruing from analysis and experiment, and more especially from the study of the pathology of speech, have been most instructive. The similar problems, involved in the reproduction of musical sounds, have had little attention, strange to say, despite the analogous terms in which they may be stated. It is to some aspects of these two facts—"internal speech," the *parole intérieure* of the French, and "internal song," the *chant intérieur*—that this paper is devoted, especially in the way of interpreting the results now widely accepted, in terms of our general psychological theory. What happens when we have "words in our minds" and "tunes in our heads?" The following positions are supported by detailed arguments:

1. What may be called the law of "sensi-motor association"—"every sensational state is a complex of sensor and motor elements, and any influence which strengthens the one tends to strengthen the other also."
2. The subjective element of recognition in general is due to the association between the constant "motor ingredients" of mental states and the motor elements of the attention.
3. All pitch reproduction is auditive. Pitch recognition (absolute) is due to association between the motor ingredients of pitch qualities and the motor elements of the attention.
4. Verbal reproduction is of several types—motor, visual, auditory, etc. Verbal recognition is due to association of the motor elements of that memory image

which most readily stimulates the attention, with the motor elements of the attention.

5. The existence of memory types is due to the education of the attention under the operation of the "law of sensori-motor association": the motor ingredients of a particular kind of memories become in this way implicated, by association, with the motor elements of the attention.

6. The facts that "increased intensity of sensation draws the attention," and that "attention increases the intensity of sensation," are both explained as partial statements of the "law of sensori-motor association."

7. The facts, also, that "increased intensity of stimulus shortens reaction-time," and that "motor reactions are shorter than sensory reactions," are explained as deductions from the law of "sensori-motor association." This law also—with the memory types which it produces—explains the discrepancies reported by different observers in the matter of sensory and motor reactions.

[Abstract of an article published in the *Philosophical Review*, July, 1893, pp. 385ff.]

THE TRIAL OF SERVETUS.

By CHARLES W. SHIELDS.

Michael Servetus, a Spanish physician, was executed for seditious heresy at Geneva in 1553. A study of the official records of the tragical trial, in the light of other contemporaneous writings, has revealed some facts which have not been brought into view with clearness and impartiality by ecclesiastical historians of any school, Catholic or Protestant. The only accurate narrative has been given by a civilian, Albert Rilliet, a native of Geneva, who had access to the public archives, and writes in a judicial spirit without any theological

prejudice, apparently without much theological knowledge. The points not hitherto emphasized are as follows:

First. The trial was not an ecclesiastical but a civil process before a tribunal of twenty-five citizens, nine of them judges in causes criminal, and was conducted in strict accordance with the law and evidence. The court having jurisdiction was the little Council or Senate, not the Consistory or Presbytery.

Second. The charges in the indictment were not wholly theological, but involved the political charges of blasphemy, sedition and conspiracy. The proof of the theological charges was presented by an expert divine; but the proof of the political charges appeared before the eyes of the Court itself during the trial. Had the prisoner been acquitted as orthodox, he might still have been held guilty of the other charges. In fact, he would have been released but for his political guilt.

Third. The arrest of Servetus under such charges was unavoidable as well as justifiable, being required not merely by the peace of Christendom or the interests of orthodoxy, but by the critical state of religious and political affairs within the republic. He was no inoffensive stranger passing through Geneva to Naples, but a long declared enemy who had been secreted in the city a whole month with his accomplice, the printer of his book, and he was found conspiring with two powerful factions; with the Libertines, who opposed the reformed church with the most immoral tenets and practices, and with the Patriots (*enfants de Genève*), who hated it as a foreign element, having deprived the refugees of the right to bear arms within the city walls. Had Servetus been let alone, these combined forces, as events showed, would have involved both Church and State in anarchy and ruin.

Fourth. The case became still further complicated with a vital question of jurisdiction. The Senate by the Reformation had succeeded to the episcopal powers formerly exercised by the bishop-dukes of Savoy, and with a show of legality claimed the right to absolve Berthezier, leader of the Libertines, from an excommunicating sentence of the Consistory. The judges were thus drawn to the side of his protégé, Servetus, and the Church was threatened with extinction.

Fifth. In this confused state of parties, the case was appealed to the other magistrates and churches of the Swiss confederation, to those of Zurich, Basel, Schaffhausen and Berne, as umpires at once disinterested, competent and final. Their condemnation of the prisoner was unanimous, and in the case of Berne, it had a mandatory force, owing to the Bernese protectorate over Geneva.

Sixth. After having been thus condemned by the highest Protestant authorities of Switzerland and already burned in effigy by the Catholic authorities of France, Servetus was finally sentenced to death by the Senate in accordance with the Justinian code and the ancient statutes of Geneva. The judicial vote was unanimous, and its legality could not be questioned by any of the parties. "Viewed by our consciences," says Rilliet, "it is odious; but it was just, according to law."

It should be added, that this legal sentence of a civil tribunal was in accordance with the theocratic doctrine of the age, and was afterwards fully approved on Scriptural grounds by all the reformers whose opinions are known, without a single exception. John Knox declared that a blasphemous heretic "if he suffer the death pronounced by a lawful magistrate is not persecuted for his conscience, as in the name of Servetus ye furiously com-

plain; but he suffereth punishment according to God's commandment pronounced in Deuteronomy the 13th chapter." Melanethon, the mildest if not the most enlightened theologian of the time, held up the action of the Senate as a pious example to Christian princes and claimed for it the gratitude of posterity. In still stronger terms it was vindicated by Farel, Peter Martyr, Bucer, Bullinger and Beza. The only one of the reformers who in distinct terms deprecated the fate of Servetus, endeavored to avert it, and when it became inevitable, sought to mitigate its atrocity, was the man who had suffered most at his hands and had the highest stake in his trial. In these respects Calvin was in advance of his age. His Scriptural defence of the current doctrine concerning seditious heresy may be usefully compared with the Scriptural defences of slavery, civil war and capital punishment by Christian divines of our own time.

[Substance of an article in the *Presbyterian and Reformed Review*, August, 1893.]

THE TOPOGRAPHY OF SPARTA.

By NICHOLAS E. CROSBY.

The topography of ancient Sparta, based on the description of the city given by Pausanias, has been treated of by many archaeologists and travelers, especially by Stein and Nestorides, a German and a Greek respectively, whose pamphlets on the subject have recently appeared, introducing many changes in former views. Thus, among other minor points of difference, the celebrated Spartan Dromos and Platanistas are placed by them in the western part of the city, and not as formerly beside the Eurotas river; while the Agora is put south of the main hill of the city, *i. e.*, the Akropolis, and not upon this

eminence, as Leake located it. In these two main particulars the writer agrees with Stein and Nestorides, but he differs from them with regard to the direction of three avenues followed by Pausanias, as well as the sites of the Akropolis and the height termed Alpion. He considers that Pausanias described these streets in their regular order, from the Agora as his starting-point, and that the Apheta ran to the east and southeast, not to the south; while the Skias-street, which both the above-mentioned authors place to the northeast, lay, on the contrary, to the south. As a consequence the positions of the majority of temples and other monuments named by Pausanias differ considerably from those of all former plans; and the two ruins which, with the exception of the theatre, alone remain on the ancient site, he identifies as the temple-tomb of Kastor and the pedestal of the colossal statue of Demos on the Agora. The latter is described by Dr. Waldstein, the American archaeologist, as the circular building of Epimenides, which contained some statues of gods according to Pausanias. In this opinion he follows Nestorides, but the fact that he found a colossal thumb in the ruin points rather to the colossal figure of Demos, mentioned by Pausanias, and favors the topographical arrangement adopted by the author. As for the other ruin to the south, Waldstein considers it to be a small temple, not a tomb, as universally regarded heretofore. The name given it for ages past, "The Tomb of Leonidas," is undoubtedly incorrect, but that it resembles a tomb no less than a temple is certain. It stands in a position which exactly suits its identification with the tomb of Kastor (that is, according to the writer's plan), and over the tomb was erected a temple, according to Pausanias, thus satisfying Dr. Waldstein's criticism

as well. Further excavations by the American school next year may possibly settle many questions with relation to Spartan topography, though Dr. Waldstein is not sanguine as to the results, seeing that the city suffered wholesale dilapidation during the course of ages, and scarcely a stone is supposed to have been left standing upon another.

[Abstract of dissertation presented for the degree of Ph D., May, 1893, and published in the *Am. Jour. of Archaeology*, VIII, 3.]

THE MADONNAS OF LUCA DELLA ROBBIA.

By ALLAN MARQUAND.

The object of this paper is to bring into chronological sequence the Madonnas which may be properly ascribed to Luca della Robbia—a few of which are in bronze or marble, but the great majority in glazed terracotta ware. In some cases there is little difficulty as the monuments are well authenticated and dated by contemporary documents. But in the majority of cases, where there is no such evidence, the monuments must speak for themselves. In these cases the sufficiency of similarity to authenticated monuments must be our guide. When this similarity has appeared to me insufficient I have omitted all mention of the monuments, whether I was able or not to ascribe them to other artists. Even in the present list I am aware that the attributions must be accepted with different degrees of security and that there may be other Madonnas, rightly to be ascribed to Luca, that have eluded my search. Nevertheless it is useful to bring such order as we can into a field where no small amount of confusion still exists. I have therefore arranged the Madonnas of Luca della Robbia according to the following periods:

I. 1400-1430. *The Early Period, showing strongly the influence of Ghiberti.*

(1) The Oxford medallion of 1428. This is a stucco reproduction of a bronze medallion, on the back of which is an incised inscription recording the reproduction of the medallion on Jan. 17, 1428.

(2) The Spitzer medallion in the Louvre. This is a terracotta unglazed reproduction of the same subject.

(3) Medallion of the Nativity, South Kensington Museum. Though possibly executed by one of his successors, this medallion reflects the early style of Luca.

(4-8) Medallions of the Madonna and Child with six angels. These medallions are unglazed and are found in the Louvre, and in the private collections of Sir Charles Robinson, London, Lady Eastlake, London, M. Courajod, Paris, and Herr von Beckerath, Berlin.

(9-10) Madonna and Child in a niche. Full length figures of small size, unglazed; in the South Kensington Museum and in the collection of Herr von Beckerath.

II. 1430-1440. *The Decade of the Organ Gallery Reliefs.*

(11) Stucco reliefs of the Madonna and Child and four saints, Louvre.

(12) Unglazed, pointed-arched lunette of the Madonna and Child between two angels, Berlin Museum. The angels show strong resemblance to the children on the organ gallery reliefs in the Cathedral Museum, Florence.

(13) Lunette of the Madonna and Child between two angels, from the Church S. Piero Buonconsiglio, Florence. This large, glazed lunette, now in the Museo Nazionale, Florence, is a representative example of Luca's early style.

(14) Rectangular relief of the Madonna and Child seated upon the clouds, Bardini collection. This fine example of Luca's work is now in the market, after having been long in the possession of the Frescobaldi family.

(15) Medallion of the Madonna and Child in the tabernacle at Or San Michele, Florence.

(16) Group of the Visitation, S. Giovanni fuorcivitas, Pistoia. This group is generally ascribed to Andrea della Robbia, but it would seem to be the work of his uncle.

(17) Lunette of the Madonna and Child between two angels, Via dell' Agnolo, Florence.

(18) Medallion of the Madonna and Child between two angels, Museo Nazionale, Florence.

(19-20) Madonna and Child in a niche, Gavet collection, Paris, and a replica in Quincy A. Shaw collection, Boston.

(21) Glazed framed relief of the Madonna and Child, Berlin Museum.

III. 1440-1450. *The Decade of the Bronze Sacristy Doors.*

(22) Mater Dolorosa in the Pietà, lunette of the marble tabernacle at S. Maria in Peretola.

(23) Stabat Mater in the Crucifixion relief, Impruneta.

(24) Ascension lunette, Florence Cathedral. The Madonna here appears with the Apostles as a spectator.

(25) The Madonna of the Bronze Sacristy Doors, Florence Cathedral.

(26) S. Maria del Fiore, relief in Museo Nazionale, Florence.

(27) Large unglazed relief of Madonna and Child, Berlin Museum.

(28) The Madonna and Child of the Innocenti Hospital, Florence.

IV. 1450-1460. *The Decade of the Federighi Tomb.*

(29) Lunette of Madonna and Child with Saints, S. Domenico, Urbino.

(30) Madonna and Child with an apple, Marquis Carlo Viviani della Robbia collection.

(31) Mater Dolorosa on the Federighi Tomb.

(32-33) Medallions on the Chapel of the Madonna, Impruneta.

(34) Madonna and Child holding a quince, Museo Nazionale, Florence.

(35) Madonna and Child holding an apple or quince, Berlin Museum.

(36) Madonna with draped standing Child, Museo Nazionale, Florence.

V. 1460-1482. *The Final Period.*

(37) Medallion of the Adoration, Foule collection, Paris.

In the Berlin Museum there are many Madonnas in stucco of the xv century, attributed to Luca della Robbia. In our estimation a very few of these reflect his spirit, but the majority are outside the range of his direct influence.

[Abstract of a paper in the *American Journal of Archaeology*, Jan.-March, 1894.]

BYZANTINE ARTISTS IN ITALY FROM THE VI TO THE XV CENTURY.

By A. L. FROTHINGHAM, JR.

In a recent number of the *Revue de l'Art Chrétien* (May, 1893), M. Eugène Müntz, the well-known historian of art, published an article entitled "Les artistes Byzantins dans l'Europe latine du Ve au XV^e siècle." He here collects for the first time some documentary evidence as to the presence of Byzantine artists in Western Europe, the great majority referring to Italy. In view of the contradictory affirmations of equal vehemence as to the presence or absence of Byzantine influence in the West during the Middle Ages, I have offered in this paper a supplement to M. Müntz's documents relating to Italy. They are either artist's signatures or contemporary or later literary texts: their absence at any period does not entail the absence of Byzantine influence or artists, nor does their quantity stand in any scientific relation to such facts; and in this respect I

cannot agree with M. Müntz, who believes that the few documents to which he has called attention prove that "the Byzantine influence was rather intermittent than constant and general." Their presence proves much; their absence would prove nothing. I do not include monuments bearing Greek inscriptions, although they certainly imply the presence of Greek artists; but I include a few portable works which bear the signature of Byzantine artists, with the precautionary remark that the presence of these artists in the West is not proven.

VI Century.—M. Müntz finds nothing authentic. I would suggest some of the works executed by order of Belisarius and Narses. At Ravenna the treasurer Julianus was the architect of the churches of S. Maria Maggiore, S. Michele in Africisco, S. Apollinare in Classe and S. Vitale, the style of which is amply sufficient to stamp him as a Byzantine artist, though he may have been a native of Ravenna.

VII, VIII and IX Centuries.—For these three centuries M. Müntz merely calls attention to the fact that so many of the Popes from 685 to 752 were Greeks and Syrians, and alludes to the Greek monks introduced by Paul I into the monastery of SS. Stephen and Sylvester. I would add that Rome was then crowded with Greeks and its monasteries with Greek monks. A part of the river bank was called in the VIII century *Ripa Græca*, on account of the Greek quarter; and here was the *Schola Græca*, to which was attached the church of *S. Maria in Schola Græca*, afterwards called *in Cosmedin*; while all around here were Greek monks at SS. Alessio e Bonifacio, S. Saba, S. Sabina, S. Balbina, S. Pantaleo, S. Basilio, S. Cesareo, etc.

In the first part of the ninth century Venice had, if we are to believe a late authority, Sansovino, its first instalment of

Byzantine artists, sent by the Emperor Leo V to build the church of S. Zaccaria (c. 820). This was in consequence of a visit made to Constantinople by doge Giustiniano Partecipazio. At about the same time Pope Leo III was sending to Ravenna his chamberlain, the Greek architect Chrysaphos, charged with the restoration of the great basilica of S. Apollinare in Classe, which the inhabitants were unable to do for themselves. A sad fall for so proud a city, the former seat of civil power in Italy.

Cattaneo has proved (*L'architettura in Italia*) that during these three centuries, and, in fact, into the xi century, the Byzantine style was paramount in Italian decorative sculpture, and that these works demonstrate the presence of Greek artists.

X and XI Centuries.—The facts reported for these centuries by M. Müntz are: (1) a late tradition about the architects of S. Mark, Venice; and (2) the calling of Byzantine artists to Monte Cassino by Abbot Desiderius. Among possible Byzantine buildings of this period in Italy I would pick out the cathedral of Pisa. It is an interesting and debated question whether its principal architect, Buschettus, was a Greek. The ancient evidence and tradition are both in favor of this view, and its opponents, even, are willing to grant that his education was under the Byzantine school. The ground-plan, in the form of a Greek cross, and the dome are in favor of the Byzantine hypothesis. The presence of Greek sculptors, a little later, in the work on the baptistery of Pisa, is quite certain from the style of the sculptures, which are, furthermore, said by Vasari to have been executed by "scultori greci." Sicily was then a centre of Byzantine art. A good example of the pre-Norman period is the illumination of a MS., executed in Palermo, con-

taining the statutes of a guild of Greek shipbuilders. A crypt at Carpignano was decorated with wall-paintings in 959 by Theophylaktos and in 1029 by Eustathios.

XII Century.—The same scarcity holds good in this century, for which M. Müntz cites two examples: (1) The Greek weavers established at Palermo by Roger II in 1146; and (2) the Byzantine mosaicist Indriomeni, who worked in Venice in 1153.

I would add Bion, a bronze caster, the only one among the many Byzantine artists employed by the Norman Kings of Sicily whose name is known. He cast, in 1136, the great bell of the cathedral of Palermo for Roger II. Also Daniel, who decorated and signed a chapel near Brindisi in 1197. At this time lived the monk Theophilus, who wrote *Diversarum Artium Schedula*, the great mediaeval technical manual of the arts: he shows such detailed acquaintance with the methods of the Byzantine workshops that he must have visited some, probably in Venice or Sicily.

XIII Century.—This is a time more prolific in information. The documents of M. Müntz refer to (1) the architect Nicholas of Constantinople, at Lucera; (2) the painter Theophanes of C., in Venice; (3) the mosaicist Apollonius; (4) the painter Andrea Rico of Candia.

To these I can add a number. There was in Palermo, in 1756, a painting signed by the Greek monk Cyril. At the abbey of the Sacro Speco, at Subiaco, famous as a principal centre of the Benedictine order, the subterranean church is well-nigh entirely painted by a painter who signs himself Conxolus. His work is dated in about 1220, and is extremely interesting as being some of the best in this part of Italy before the time of Cimabue. It contains a large and monumental series of compositions.

M. Müntz mentions one work by Andrea Rico of Candia, in the Uffizi at Florence. There are one or two by him at Parma and one in Naples. I am inclined to place this painter in the second half of the XIII and early XIV century, and to identify him with the noted mosaicist, Andrea Tafi, whose life—or an apology for it—appears in Vasari. Andrea Tafi's real name in contemporary documents is Andrea di Rico, called Tafo. If these two artists are but one, we can fancy Andrea coming from Crete and reviving the art of mosaic painting in Florence. Two painters of panel pictures, who appear to belong to this period, or to the next century, are John and George Clotzata.

XIV Century.—In addition to the painters Marc, Demetrius and George, mentioned by M. Müntz, I give the following: Stammatico signed himself as *Stamatico greco* on wall paintings at the Sacro Speco at Subiaco, not far from the more extensive works of his earlier co-nationalist Conxolus. A tradition gives him a later

date. Other names occur on portable paintings of this period, or a little later, in Italian collections: Antonios Pampilopos, Eutychios, Eustratheios, Donatus Byzamantus. There was in Otranto a family of Greek painters, the Byzamani, who flourished for a century or more. Donatus was the earlier and Angelus the later. George of Constantinople signed a painting in the Brera at Milan (c. 1400). M. Müntz had found documents regarding him.

XV Century.—Antonio da Negroponte is one of the earliest painters of the Venetian school, a pupil of Jacobello del Fiore, and while his style is thoroughly Italian, he undoubtedly came from Greece.

While I do not believe in drawing conclusions from such limited information we may affirm that this collection of facts appears to strengthen the artistic hold of the East upon the West.

[Summary of a paper published in the *Am. Journal of Archaeology*, vol. ix, No. 1.]

REVIEWS OF BOOKS.

MICHEL STROGOFF par *Jules Verne*, abridged and edited with notes by Edwin S. Lewis, Ph.D.

During the last decade a considerable number of French texts have appeared in annotated editions for the use of schools and colleges; yet in spite of this abundance, there is not a single one which, in addition to furnishing interesting reading, can advantageously be placed in the hands of beginners at a very early stage, say in the second month of their course. The reason is because all of these texts presuppose in the student the knowledge of the irregular verb, which cannot be acquired within the short time of a first month. Dr. Lewis, however, has solved

the problem by an ingenious device. Whenever an irregular form occurs in the text, he by a figure refers the reader not merely to its infinitive as other editors have done, but to a complete table of irregular verbs annexed to his book and giving all the principal parts at a glance. Thus the chief stumbling-block in the way of the beginner is successfully removed and connected French prose of average difficulty is brought within his grasp as early as the second month of his course. All this, of course, does not mean that the student hereafter will be exempt from the study of that formidable table, but it is reasonable to expect that, by incessantly consulting it as he reads along, he will to some

extent familiarize himself with it, and this must help him later when he takes up its study systematically.

There cannot be any doubt, therefore, that the innovation introduced by Dr. Lewis is advantageous in more than one respect.

As to the story itself, it is most carefully and beautifully written and not at

all devoid of literary merit. "Michel Strogoff," it is true, would not have Jules Verne for its author were it not full of thrilling incidents; if they are not all perfectly probable, they are, at least, possible and free from that wild and unbridled fancy with which the public labels the work of the author of "A Trip to the Moon."

H. C. O. HUSS.

NOTES.

ALFRED P. DENNIS has been prosecuting historical researches for the past year in preparation of a work on Civil and Ecclesiastical Beginnings in the South. From evidence furnished by Colonial records and contemporary English Historians, the generally accepted theory that the early settlers of North Carolina and of Maryland were religious refugees is rejected. In regard to the Maryland settlement, the theory of Lord Baltimore's tardy conversion to Catholicism is vigorously combatted. From the known policy of the First Lord Baltimore in planting the previous colony of Avalon for revenue purposes only; from the proven fact that a large proportion of the original Expedition was Protestant in sympathy; and from the evidence that the Catholics were shown more indulgence by the Crown at the period than at any time for the past seventy years, establishes in the mind of the writer the thesis upon which he insists—namely, that the early settlers were not religious refugees—that they came to the province not from religious but mainly from economic motives.

COURSE FOR STUDENTS WHO INTEND TO ENTER THE MEDICAL PROFESSION.—This course will include the required Academic classes in General Chemistry, Botany and

Zoology, Mechanics and General Physics; and also the following Elective courses,—*Junior Year 1st Term*, General Biology and Theoretical Chemistry; *2d Term*, Practical Botany, Vertebrate Anatomy, and Histology; *Senior Year, 1st Term*, Laboratory Chemistry (in place of it for this year, Theoretical Chemistry with the Juniors), Physiology, Comparative Osteology, Morphology, and Physiological Psychology; *2d Term*, Human Anatomy, Embryology, Histology, and Palaeontology.

THE first number of *The Psychological Review*, a bi-monthly journal, was published on January 1, 1894, by Macmillan & Co. of New York and London. It will contribute to the advancement of psychology by printing the results of experimental investigations, constructive and critical articles, and prompt reviews or concise abstracts of all publications of importance in the psychological field. The growth of scientific psychology in America during the past few years has been rapid, and it is felt that a Review is needed which will represent this forward movement with equal regard to all its branches and to all universities and contributors.

The Review is edited by Professor Baldwin (Princeton University) and Pro-

ffessor Cattell (Columbia College) with the co-operation of Professor Binet (Sorbonne, Paris), Professor Stumpf (Berlin University), Professor Sully (University College, London), Professor Dewey (University of Michigan), Professor Donaldson (University of Chicago), Professor Fullerton (Uni-

versity of Pennsylvania), Professor James (Harvard University), Professor Ladd (Yale University), Professor Münsterberg (Harvard University), and Professor Starr (College of Physicians and Surgeons, New York).

VITAE.

DR. J. BRACE CHITTENDEN, elected instructor in mathematics for the current year, was born in Milford, Conn., 1864, graduated from Brooklyn Polytechnic in 1884. Entering the same year the School of Engineers at Worcester, Mass., he was there awarded two degrees in 1888, one in Civil and the other in Mechanical engineering. Mr. Chittenden then entered the class of '89 at Harvard and devoted his time almost exclusively to mathematics for three years, taking his degree of A. B. in '89, and of A.M. in '90. In '91 he received the appointment as Kirkland Travelling Fellow, for which a Parker Fellowship was substituted in '92, and on these foundations he traveled in Europe, and studied for four semesters with Prof. F. Lindemann and his colleagues at Königsberg in Prussia, from whence he has just received the degree of Ph.D. While at Harvard Dr. Chittenden wrote theses on "The Mathematical Conception of Infinity," and "An Application of Bessel's Functions to a Problem in Heat." His Doctor's thesis, published in English by Teubner, Leipzig, and entitled 'A presentation of the "Theory of Hermite's Form of Lamé's Equation,'" is noticed elsewhere in this BULLETIN.

DR. NICHOLAS E. CROSBY, son of Dr. Howard Crosby, was born in New Brunswick, Dec. 14th, 1861. He was brought up

and educated in the city of New York and entered Columbia College in June 1878. He obtained the Greek scholarships of \$100 in both Sophomore and Junior years, but lost his position in his class by leaving for Europe in the early part of April, 1882, with the privilege granted of passing his final examinations at some later time. After a European tour of seven months, he returned to New York and continued his studies at Columbia. He taught the classics at the Drisler School in 49th street during 1883-4 and received his A. M. degree from Columbia in 1885. He left America in the fall of 1886 for Greece, where he remained until the spring of 1887, pursuing archaeological studies as a member of the American School at Athens. On his return he received an honorary Fellowship from Columbia and was instructor in Greek at that college during 1887-88. He spent the two years 1889-91 at Dobbs Ferry, N. Y. as classical instructor in the Westminster school.

He came to Princeton as instructor in Latin and Greek during 1891-92, pursuing his studies at the same time towards the degree of Ph.D. He spent the winter of 1892-93 in Greece, where he wrote his thesis on The "Topography of Sparta," and continued his studies for the degree. Returning to Princeton he received his degree in June and is now fellow and instructor in Archaeology and the History

of Art, his work being in the department of classical studies.

MR. FRANK ALLAN WATERMAN, who takes the place as Instructor in Physics left vacant by the resignation of Mr. Dodd, was born in Oswego, N. Y., July 9, 1865. He prepared for college at Fulton Academy, Fulton, N. Y., and graduated at Princeton in 1888. After graduation he taught in Cornwall Heights School, Cornwall-on-the-Hudson, N. Y., and King's School, Stamford, Conn., giving especial attention to the subject of Physics. In 1891 he became Assistant to Dr. A. P. Carman, Professor of Physics in Purdue University, Lafayette, Ind., and for the year 1892-93 he was Professor of Physics in that institution. He has published a manual on Physical Laboratory work.

REV. JOHN G. HIBBEN, recently appointed assistant Professor of Logic, entered Princeton in 1878, and graduated in 1882. Studied the following year in Berlin, as

Fellow in Mathematics, and entered Princeton Seminary in '83, graduating in '86. During this time he was Tutor in Mathematics a part of one year. He received the A.M. degree in '85; was pastor of the Falling Spring Presbyterian Church in Chambersburg until 1891; was Instructor in Logic until February, 1893, when he was appointed assistant professor of Logic. He received the degree of Ph.D. in June, 1893.

MR. HINTON was educated at Rugby and at Oxford, where he obtained a first class in mathematical honors. He also spent a year in the Physical Laboratory at Berlin. He has held assistant masterships in the Cheltenham and Uppingham schools, and was during four years head master of the Victoria Public School of Yokohama. He is the author of "A New Era of Thought" and "Scientific Romances," a series of brochures of popular character on questions of a metaphysical interest in mathematics and physics.

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A QUARTERLY RECORD EDITED BY
THE PRESIDENT AND MEMBERS OF THE FACULTY

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General Editor: President F. L. Patton.

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The BULLETIN is a quarterly publication. The yearly subscription is \$1.

Subscriptions should be sent to the Princeton College Bulletin, P. O. Box 608, Princeton, N. J.



THE WASHINGTON PORTAIT IN NASSAU HALL
C. W. PEALE.

PRINCETON COLLEGE BULLETIN.

EDITED BY THE PRESIDENT AND MEMBERS OF THE FACULTY

VOL. VI.

APRIL, 1894.

No. 2.

THE WASHINGTON PORTRAIT IN NASSAU HALL.

By HENRY C. CAMERON.

For the first few years of its existence the College of New Jersey possessed no buildings but depended upon the kindness of the Presbyterian churches of Elizabeth, Newark and New Brunswick for the use of their lecture rooms for purposes of instruction and of their church buildings for the exercises of Commencement. By the liberality and wise forethought of some of the citizens of Princeton, ground and money were given to the Trustees, so as to secure the establishment of the College in this town. One of those citizens, Mr. Nathaniel Fitz Randolph, who gave the land for the College, made the following entries in his journal:

“July 29, 1754, Jos. Morrow set a man first to begin to dig the college cellar.”

“September, 1754, the first corner stone of the New Jersey College was laid in the northwesterly corner of cellar by Thomas Leonard, Esq., John Stockton, Esq., John Hornor, Esq., Mr. William Worth, the mason that built the stone and brick work of the College, myself and many others.”

“November, 1755, the roof of the College was raised by Robert Smith, the carpenter that built the timber work of the College.”

The building was finished in the autumn of 1756, and at the suggestion of Gov. Belcher, by a vote of the Trustees it was ordered, “that the said edifice be, in all time to come, called and known by the name of Nassau Hall” in honor of King William III., Prince of Orange and Nassau.

At the time of the annual Commencement, Sept., 1756, the Trustees “Voted, that the President move the College to Princeton this Fall, and that the expense thereof be paid by the Treasurer.” Six weeks later, probably on Thursday, November 10, 1756, the College was opened in Princeton as Mr. Fitz Randolph records, “in 1756, Aaron Burr, President, preached the first sermon, and began the first school in Princeton College.”

Nassau Hall was originally 176 feet long and 54 feet wide at the ends. The middle portion for the distance of about 40 feet had a projection of 4 feet in front and 12 feet in rear. Long halls extended its whole length from East to West and there were cross halls running through the building from North to South, in the first story, communicating with doors which occupied the places of what are now the fourth windows from the ends of the building. Near the South end of these halls were placed the stairs leading to the base-

ment and the upper stories. From the central door ran a large hall to the long hall in front of the door of the Chapel which was on the Southern side of the edifice. It was nearly 40 feet square and occupied two stories. Access to the gallery was obtained from the second story and it had accommodations for 250 or 300 persons. There were four large windows in the Southern side, and between the middle windows was the pulpit, in front of and at the sides of which was the stage for public speaking.

Against the chimney in the Eastern wall hung a full length portrait of King George the Second, under whose reign the charter of the College had been given; and on the opposite side was a similar portrait of Gov. Belcher. Both these paintings had been bequeathed by Gov. Belcher. The name of the artist is unknown, but they were undoubtedly painted in London, probably at the time of Gov. Belcher's visit to England ten or twelve years before. He had been Governor of Massachusetts and had been removed from the post. He visited England and convinced the Home Government of the injustice that had been done him, and he was promised the first Colonial Governorship that fell vacant. This happened to be that of New Jersey, and to this he was appointed in 1748, and from him the College received its second and enlarged charter, September 14th, 1748. He was accustomed to call the College his "adopted daughter," and advanced its interests in every way.

Nassau Hall, when erected, was the largest building in the Colonies and was the best adapted for college purposes. It contained sixty rooms besides the Chapel, including the Library in the second story front opposite the Chapel, recitation rooms, dining hall, and 49 rooms for students. There were only 70 students, but these

rooms were large and calculated to accommodate 147 students. The College was preparing for a prosperous career and Gov. Belcher and President Burr were rejoicing in prospect of attending the first Commencement in Princeton, September 28, 1757. But neither of them was destined to witness it, for the Governor died four weeks and the President four days before it occurred. Nassau Hall is a simple, unpretending building, but with a noble dignity and massive character that win not merely high regard but admiration, despite the disfiguring towers and incongruous door and window that bad modern taste has added to it. Twice burned, it has survived the fire and the vandalism which proposed to remove the walls after the second fire, March 10th, 1855.

As was remarked above, these two pictures that adorned the Chapel were the bequest of Gov. Belcher. They were undoubtedly painted in England, for there was at that date no artist in America, save perhaps John Smybert, who was capable of painting such pictures, and we know all of his paintings, the best of which is his portrait of Jonathan Edwards. The ultimate fate of these two paintings is unknown. That of Gov. Belcher disappeared, none knows how; according to tradition, in the battle of Princeton "a cannon ball passed through a window of the Chapel and took off the head of George II." The frame was uninjured and in it the portrait of Washington which was painted for the Trustees of the College was subsequently placed. In reference to the cannon ball and the injury to the portrait of George the Second, the late Dr. John Maclean used to quote to the writer of this sketch the line of Horace, *Credat Judeus Apella*. But when he came to examine the record in preparation for his history of the College he changed his opinion. It is certain

that by order of General Washington, cannon were drawn up within a short distance of Nassau Hall and firing was directed against the building in which some of the British soldiers still remained. They soon surrendered and Nassau Hall was in possession of the American troops, but only for a few hours, for Cornwallis returned from Trenton and Washington proceeded to Kingston, Rocky Hill, Pluckemin and finally to Morristown. Nassau Hall was barracks and hospital for the British and American troops, alternately, for several years of the Revolution. The interior of the building (and the Presbyterian Church in like manner) was much injured by the troops in the course of the war, but the only mark of the battle is a slight fracture of the Southern wall.

In 1783 the National Congress was obliged to leave Philadelphia in consequence of the mutinous conduct of some of the soldiers of the army in reference to their pay. Congress adjourned to Princeton, and Nassau Hall was placed at its service. They met in the Library of the College which was a large room in the second story of Nassau Hall, just above the main door, and other rooms were used for the committees. Private families gladly accommodated the members of Congress. The session continued from June 26th, until Nov. 4th, 1783.

General Washington was requested by Congress to attend the meeting and a house which is still standing near Rocky Hill, was assigned him as head-quarters; but when he attended the sessions of Congress, he is said to have been accommodated in the brick house just opposite the old President's (now the Dean's) house. With Congress he attended the Annual Commencement when Ashbel Green, the Valedictorian, afterwards President of the

College, had the honor of closing his Vale-dictory with an address to Washington.

At the close of the exercises the Board of Trustees took the following action : "The Board being desirous to give some testimony of their high respect for the character of his Excellency General Washington, who has so auspiciously conducted the armies of America,

"Resolved, That the Rev. Drs. Witherspoon, Rodgers, and Johnes be a committee to wait upon his Excellency to request him to sit for his picture, to be taken by Mr. Charles Wilson Peale, of Philadelphia. And that his portrait when finished be placed in the Hall of the College, in the room of the picture of the late King of Great Britain (George II), which was torn away by a ball from the American artillery in the battle of Princeton."

On the next day, "Dr. Witherspoon reported to the Board that his Excellency General Washington had delivered to him fifty guineas which he begged the Trustees to accept as a testimony of his respect for the College."

The following action was then taken :

"Resolved, That the Board accept it, and that the same committee who were appointed to solicit his Excellency's picture do at the same time present to him the thanks of the Board for this instance of his politeness and generosity."

These were the circumstances that led to the painting of this portrait of the Father of his country. Charles Wilson Peale, the artist of this picture, was a very remarkable man and had enjoyed peculiar advantages for the work. He was born in Chestertown, Md., in 1741. He was possessed of great mechanical skill, was a diligent student of science, the founder of a great museum in which birds and mammals were arranged by his own hands ; and so varied were his attainments that whether it was a delicate miniature on

ivory or a full length portrait in oil, the frames and all save the canvas and the colors might be the product of his own hand. He was even a dentist and exercised his skill, it is said, in connection with his later portraits of Washington. Having seen a collection of portraits his artistic genius was aroused and without previous training he began to paint portraits of his friends, and was so successful that he determined to become an artist. He sought instruction in Philadelphia from a German pupil of Sir Godfrey Kneller and from Copley in Boston. He also studied with Sir Benjamin West in London. He returned to this country and pursued his profession first at Annapolis and afterwards at Philadelphia. The most noted of his earlier portraits, strange to say, is one of Washington. With the exception of a miniature said to have been painted in 1757 when he was 25, this is the earliest portrait of Washington. It was painted in 1772 and represents him as Colonel of the Colonial militia of Virginia and in the English uniform — blue coat, scarlet facings and underclothes — as he appeared when serving under Braddock. This portrait has been often copied and is much admired because presenting him in the full vigor of manhood and yet with youthful beauty. Peale himself became a soldier in the Revolution and enjoyed the fullest opportunity of observing the character and sketching the traits of Washington. He was a captain of volunteers and participated in the battles of Trenton and Germantown and perhaps of Princeton. The Continental Congress requested General Washington to sit to Peale for his portrait and he complied with this request. The picture was begun in 1778 amid the privations and sufferings of Valley Forge; its progress was in-

terrupted by the battle of Monmouth, where, soon after the struggle of that hot day in July, the artist continued his work. Tuckerman says "the battles of Trenton, Princeton and Monmouth, intervened before its completion." But this statement is singularly erroneous; the battle of Trenton had taken place Dec. 26th, 1776, and that of Princeton, Jan. 3d, 1777, before the snow had been stained by the bleeding feet of our poorly-shod soldiers in that memorable winter of 1777-78, at Valley Forge. The picture is said to have been finished at Princeton, Nassau Hall being a prominent object in the background, but remained on the artist's hands because Congress adjourned without making an appropriation to pay for it. He made a copy of this for Lafayette which was sent to the King of France. In the French Revolution this copy was sold and becoming the property of Count Menon he brought it to this country and presented it to the National Institute in Washington where it now is in the Smithsonian Institution.

This picture and the copies made from it by the artist were pronounced by his friends admirable likenesses of Washington in his prime. In 1779 he painted another portrait in Philadelphia for the State of Pennsylvania, of which the Minister of France ordered five copies, four to be sent to Europe. He also painted one for the State of Maryland. His last portrait of Washington was painted in 1796 and he retained it until his death. He painted no less than fourteen portraits of Washington including that representing him as a Virginia colonel in the colonial service of Great Britain.

The portrait painted for the Trustees of the College is well known and is a source of pride and admiration to every son of Nassau Hall. It resembles, of course,

those that he painted between 1778-1783, differing only in the background. It represents Washington just after he had reached his prime, at the age of 51. He was tall, more than six feet high, of commanding form, with a finely shaped head, large hands and feet and unusually long arms. He had an aquiline nose, light blue eyes and a ruddy complexion. The writer well recalls one of his grand nephews whose resemblance to Washington it required no imagination to recognize. That this picture resembled Washington is well known from the statements of one who had seen him when visiting his father's house near Rocky Hill. It represents Washington standing with uplifted sword in his right hand, while his left, grasping his hat, rests lightly upon his hip. The dress is of course the continental colors, blue and buff.

Upon the ground near the feet of Washington lies Gen. Mercer who had fallen mortally wounded. Another figure, probably a surgeon, is represented kneeling behind him, while a little to the rear a standard-bearer holds aloft a flag waving in the breeze. In the middle ground is a sketch of the battle of Princeton, and in the distance is seen Nassau Hall.

Peale's second son, Titian, informed the writer that his father always painted from models leaving nothing to the imagination. Who the surgeon and the standard-bearer are is unknown; but tradition says that the portrait of Mercer was taken from his brother who greatly resembled him. It was certainly a good likeness of Gen. Mercer, for the writer has heard it stated that his son, Col. Hugh Mercer, of Fredericksburg, Va., when visiting Princeton upon one occasion, was recognised by his resemblance to this portrait, while a later descendant who was graduated from Princeton in 1856 retained in his face the

Mercer lineaments as presented in this picture of his ancestor.

Peale, who had been in the army and had made many sketches of the most prominent men must, however, have produced this portrait from his own knowledge, for the family declare that Gen. Mercer had no brother. His son Hugh was born after his father's death.

Peale, who is usually so accurate, made a mistake in the flag. The small portion of the blue field of the Union which is visible shows a single star as one of the thirteen in the blue field representing the thirteen United States.

Tradition does indeed say that our National Flag was displayed at Trenton and on the banks of Assanpink, Jan. 2d, 1776, and at the battle of Princeton, Jan. 3d, 1777. Col. Havens says "the first time that our National Flag was used *after the enactment concerning it by Congress* was by General Washington * * * January 2, 1777." Here is a great mistake however, for the action of Congress did not take place until nearly six months after the battle of Princeton. If any other than regimental or battalion flags were used it was the Union Flag of thirteen stripes which was first unfurled in the American camp at Cambridge, Jan. 2, 1776, when the Continental army was organized. The fly of this flag was composed of thirteen alternate red and white stripes emblematic of the thirteen united colonies, but the British Union was still retained which was composed of the red cross of St. George to represent England and the white cross of St. Andrew to represent Scotland, which were placed together upon the Royal Flag when James VI of Scotland became James II of England. The battles of Trenton and Princeton were fought under this flag and it was not until July 14th, 1777, nearly a year after the

Declaration of Independence, that by a resolution of the Continental Congress "thirteen white stars upon a blue field," representing now thirteen *States*, took the place of the British Union, and the "Star Spangled Banner," the sight of which now thrills the heart of every loyal American, became our National standard.

Peale possessed but little imagination but was most faithful and accurate in his delineations. More than one hundred portraits of the most eminent persons of the time of the Revolution and the period immediately succeeding painted by him are now gathered in Independence Hall. Here are General and Mrs. Washington, Hancock, Franklin, Witherspoon and many other signers of the Declaration of Independence. These all bear testimony to his skill as an artist and his success in preserving for posterity the features of those whom the country delights to remember and to honor. It is the most interesting and instructive collection of portraits in this country.

This portrait of Washington was doubtless painted partly in Princeton and partly at Washington's headquarters, at Rocky Hill. Joseph Wright, a painter of Bordentown, introduced by a letter from Franklin, painted portraits of both Washington and Mrs. Washington while they were at Rocky Hill. By request of Congress this artist also took a plaster cast of Washington's face while there, in order to execute a statue, but he was so awed in doing the work that he let the mould fall and it was ruined. Washington declined to submit to the unpleasant process a second time. The portrait was successful, and another by the same artist is most faithful in every detail but not flattering.

It is impossible, however, even to mention the numerous portraits and statues

of Washington. Two, however, must be compared with this one of Peale, those of Trumbull and of Stuart.

Col. John Trumbull, the youngest son of Gov. Jonathan Trumbull, of Connecticut, the "Brother Jonathan" whose advice Washington prized so highly, was born at Lebanon, Conn., in 1756, and was graduated at Harvard in 1774. From his childhood he was devoted to art and made considerable progress in its cultivation without any instruction. Within three weeks after the battle of Lexington the 1st Connecticut regiment had marched to the vicinity of Boston. Of this regiment he was adjutant and while it was constructing fortifications at Roxbury it was exposed to the fire of the British forces and witnessed from a distance the battle of Bunker Hill. Washington soon arrived and took command of the army. He desired a plan of the enemy's works. Young Trumbull by creeping near the works through the tall grass succeeded in making so good a one that soon after it was laid before the General he appointed Trumbull one of his aides-de-camp along with Thomas Mifflin, afterwards General and Governor of Pennsylvania. He saw the battle of Bunker Hill and just nine months after he witnessed the evacuation of Boston and soon afterward was appointed Adjutant-General by Gen. Gates who was to operate on the northern frontier and against Canada. The movement was unsuccessful, and Col. Trumbull accompanied that portion of Gates' troops which joined Washington at Newtown, Pa., "a few days before his glorious success at Trenton." But he was ordered elsewhere. This was the only opportunity he had of seeing Gen. Mercer.

Col. Trumbull, feeling that he had not been properly treated in reference to his commission, resigned and did not again

enter the army except for a time as a volunteer aid to Gen. Sullivan in Rhode Island. He went to Boston and again devoted himself to the study of art but still without an instructor for both Smybert and Copley, the pioneer painters of America, had gone to Europe. His experience in the war, his acquaintance with the most prominent men of the revolution in both civil and military life, and especially his opportunity to study the person and character of Washington were of immense advantage to him in his career as a painter. In 1780 he sailed for Europe, landed in France and soon afterwards reached London with a letter of introduction to West under whom he studied for some time. Here he met Gilbert Stuart, who was destined to immortality by his portrait of Washington, who was also studying with West at this time. In the list of works (nearly 70) executed by Trumbull before going to Europe are two half-length portraits of Washington, one a copy from Peale, the other from memory. After months of diligent study (partly in prison upon the charge of high treason) he returned to the continent and thence to America.

He engaged with his brother in supplying the army with stores and again met his "early master and friend," General Washington. His father finally yielded to his wish to devote himself to art with the remark, "You appear to forget, sir, that *Connecticut is not Athens*."

He returned to England and resumed his studies under West and at the National Academy. At this time he began his series of historical paintings of the events of the Revolution which after a visit to Paris and the Rhine for artistic purposes he continued at London and Paris and subsequently in this country, whither he returned in 1789. He engaged

for more than twenty years in painting the portraits of the actors in these great events and in sketching the places where they were enacted. The fruits of these labors are seen in the four great pictures adorning the walls of the Capitol at Washington and in the smaller pictures of the same subjects with four others which were never reproduced on a large scale. These smaller pictures are now in the invaluable Trumbull Gallery at Yale University. Among them are the Capture of the Hessians at Trenton and the Death of General Mereer at the Battle of Princeton. Of this latter there are in fact two paintings, one completed, the other an unfinished sketch. The finished picture should be reproduced in bronze to adorn the Princeton Battle Monument. In these he has made the same mistake that Peale did. He has painted the flag with the stars, twelve in a square with one in the middle. In the year 1790 he painted a full length portrait of Washington for the corporation of the city of New York. The picture represents him in full uniform, standing by a white horse, leaning his arm upon the saddle; the background shows Broadway in ruins, the lower part of the city as it was, the British ships, the evacuating army, &c. The portrait, dress, horse, furniture, scenery, all in short were minutely accurate. This picture is now in the City Hall of New York.

In 1792 he painted another in Philadelphia, now in the gallery at New Haven, which he styles "the best certainly of those which I painted, and the best, in my estimation, which exists in his heroic military character." The city of Charleston, S. C., employed him "to paint a portrait of the *great man*, and I undertook it *con amore* * * meaning to give his military character, in the most sublime moment of its exertion—the evening previous

to the battle of Princeton." He then describes the position of affairs, the plan of Washington, tells his conversation about the events of the time and then says, "He *looked* the scene again, and I happily transferred to the canvas the lofty expression of his animated countenance, the high resolve to conquer or to perish. The result was in my own opinion eminently successful, and the General was satisfied." The city of Charleston, however, preferred a peaceful likeness and such he painted for them and Washington allowed the painter to retain this one for himself. Through some members of the Connecticut Society of Cincinnati it was presented to Yale College. A copy of this portrait drew an exclamation of delight from Lafayette because of its accuracy and fidelity, although in some respects it is open to criticism.

The painter, however, whose portrait of Washington is that which will descend to posterity as the true likeness of the man, was Gilbert Charles Stewart or Gilbert Stuart as he called himself. He was born at Narragansett, Rhode Island, in 1755, early showed a taste for painting and received instruction at the age of fifteen from a Scotch artist, Cosmo Alexander, whom he accompanied to Scotland. He returned to this country and after a time went back to Europe and finally settled in London where Trumbull found him at work under Sir Benjamin West, of whom as also of Sir Joshua Reynolds he subsequently painted most admirable portraits. He also painted an excellent likeness of Trumbull when the latter was thrown into prison as a rebel and perhaps a spy but was saved from death by the influence of West with the king. He painted the portraits of a number of most distinguished persons in England and Ireland, and in France he executed a portrait of Louis

XVI. At the height of his reputation in England he came to America for the express purpose of painting a portrait of Washington, who at that time had won the admiration of the world, of whom it has been said "the noblest names of antiquity lose their lustre in his presence." In many respects he was the finest portrait painter this country has ever seen, by reason of his admirable flesh coloring and of his remarkable power of representing on the canvas the soul and real character of the man. He painted the portraits of all our earlier Presidents and of many of the most distinguished men who lived in this country at the close of the last and the earlier part of the present century. And yet to produce a satisfactory likeness of Washington almost baffled his genius. "There were," he said, "features in his face totally different from what I had observed in any other human being; the sockets of the eyes for instance, were longer than what I ever met with before, and the upper part of the nose broader. All his features were indicative of the strongest passions; yet, like Socrates, his judgment and great self-command made him appear a man of a different cast in the eyes of the world." Stuart devoted months in 1794-95 to painting simply the head of Washington. After the most laborious efforts he finished the full length portrait which was presented to the Marquis of Lansdowne by Mr. Bingham of Philadelphia. He made twenty-two copies of the original, but no copy ever satisfied him. He began another portrait in 1796 at the request of Mrs. Washington and promised to give it and the portrait of herself to Gen. Washington, if successful, when *finished*. The heads were perfectly successful, but he purposely left the pictures unfinished, even as to outlines, that he might retain them for himself.

It is Stuart's portrait of Washington which will go down to posterity as the true likeness; and in many respects it is the most admirable. The full length portrait by Stuart represents him in elegant civilian dress and shows us the *man* and not the *General*. When Lafayette saw the copy of the Lansdowne portrait, made simultaneously with the original, he exclaimed, "That is my old friend indeed." And yet it has been justly criticised. Peale had used his skill as a dentist to supply Washington's loss of teeth. The writer has seen an engraving of a portrait by a contemporary artist which represents Washington with sunken lips and hollow cheeks. This must have been an accurate portrait, for no painter would have dared to give such a representation had it not been correct. Stuart used cotton to remedy this defect and employing it in excess he has made the lower part of the face broader than it really was and given an air of feebleness to the mouth that it never possessed. Peale's portrait in this respect was more correct. The eyes also are of too deep a blue, but as Stuart said to Mr. G. W. P. Custis, "In a hundred years they will have faded to the right color." Peale is said to have remarked of this portrait in after years "that if Washington had risen from the dead and not resembled Stuart's portrait the people would not have believed that it was Washington." These are three admirable portraits of Washington, each possessing its own excellence and being a faithful likeness.

With this portrait of Washington by Peale the writer of this sketch was connected in a peculiar way. Nassau Hall was burned for a second time on the evening of March 10th, 1855. The fire began in room 33 A, in the second story, in the eastern wing, and burned for some time before any one had an idea that the building would be

consumed. What had formerly been the Chapel had been transformed into a picture gallery, and here hung this portrait of Washington, with portraits of the Presidents of the College and others. Desirous of saving this picture he asked for the keys of the room and they were refused him. The flames kept advancing and he determined to effect an entrance and save the picture. He endeavored unsuccessfully to break open the door. His own strength being insufficient he called upon students and others in the crowd to assist him. The door was burst open and he ordered this picture to be removed. It was done and with the others he directed them to be placed in the vestibule of the Library, now the College Offices, where he joyfully received this portrait now a second time saved from fire.

It has been stated that there was originally also a portrait of Gov. Belcher in the Chapel, which was destroyed or disappeared in the time of the revolution. In July, 1855, the writer made his first visit to Boston. Every place of public and historical interest was visited. One day in a building in which were gathered many historical objects, while examining a collection of old portraits which for want of room were placed leaning against one another, he found a portrait of Gov. Belcher. He remarked to the gentleman in charge, "We ought to have this portrait in Princeton." "Oh," he replied, "he was Governor of Massachusetts." "But he was Governor of New Jersey too, and gave us the charter of our College." Upon his return to College, he reported his discovery, and a couple of years afterwards Prof. George M. Giger had a copy of the portrait made by a Mr. Wright of Boston, and presented it to the College. There are but few portraits of George II, and there were but few persons who were allowed to paint por-

traits of the royal family in those early days. The writer has seen several times in London, a full length portrait of that King, just about the size of Peale's portrait of Washington. He is about taking measures to ascertain if possible the name of the artist, the date of the painting and its exact size. If the frame is of the same size and was painted about the time Governor Belcher was in England, the statement as to the pictures and the frame may thus receive additional confirmation.

SYSTEMATIC GIVERS TO THE COLLEGE LIBRARY.

It is not as generally known as it deserves to be that the College Library systematically receives considerable additions from certain alumni who take an active interest in its growth.

The constant benefactions by or through CHAS. E. GREEN, Esq., '60, are pretty well known to those interested, and to them is due not only a great part of the growth in the past, but in large measure the considerably increased annual accessions during the past few years.

The gifts of Mr. PIERSON, too, which now amount to quite 5,000 volumes, and are continuous, are well understood; but it is not so well known that there are several other alumni whose constant habit of keeping the library in mind results in the addition of a good number of fine books each year.

Professor MARQUAND is one whose quiet gifts to the art alcove and the general library have numbered in the scores each year, and include sets of art periodicals and current volumes, with their expensive bindings, as well as individual works, the latest gift including a series of about twenty-five volumes on photography. He also allows the librarian to

refer investigators to his extensive private art library, some of whose contents are to be catalogued among the cards of the general catalogue, and so made to contribute practically to the art department of the library.

Another giver is M. TAYLOR PYNE, Esq., '77, who, in addition to the constantly appearing volumes of the important and very expensive series of the Stevens' *Facsimiles of Manuscripts in European Libraries relating to America*, has sent a considerable number of standard modern English books. The Stevens facsimiles have reached the seventeenth volume, and are indispensable to the student of American history. Mr. PYNE's latest gift is in conjunction with J. BAYARD HENRY, Esq., '76, and consists of nearly 500 autograph letters and documents, almost all relating directly to the college. It includes documents by King William of Orange, after whom Princeton was first called Nassau Hall, and King George the Second, under whom her charter was received. A few of them, including a bill of sale by John Livingston to President Burr of a negro man, Caesar, a bill for a trustee (?) dinner in 1771, and a financial statement of Samuel Hazard relating to the college lottery in 1751, which contains item of debt of Benj. Franklin, were presented framed, and have been hung on the ends of the alcoves in the main room.

The collection contains also autographs of Gov. Belcher, the Burrs, father and son, Boudinot (letter transmitting diploma to President Madison, which diploma Mr. Pyne also has); Dickinson, Davies, Dallas, Ellsworth, Pierpont Edwards, Livingston, Green, Madison, Benjamin and Richard Rush, Randolph of Roanoke, many distinguished Stocktons, almost all the Presidents of the College, many Princeton graduates who were signers of the Declara-

tion of Independence or members of the Constitutional Convention, and many curious and interesting documents.

To make any sufficient account of this unique and valuable collection would require a much more extended study of it than the librarian has as yet been able to make, but he hopes at some later date to give a more detailed account of the collection in the BULLETIN or elsewhere.

Other contributions to college documents are constantly being made by Prof. LIBBEY, '77, who is indefatigable in adding to his collection of Princetoniana, which is to be placed in the main library when the hoped-for extension of the building has been made. He also, like Prof. Marquand, grants to investigators the use of his extensive private collection of books on Physical Geography.

The latest accessions to the ranks of regular givers are both from the class of '88—J. S. MORGAN, Esq., and C. W. McALPIN, Esq. Mr. McALPIN has recently given a most attractive copy of Wansey's *Journal of an Excursion to the United States of North America in the Summer of 1794*, containing about sixty extra illustrations. The volume is especially interesting to Princetonians for its account of the college. "At Princeton is a very handsome college; it is a large uniform brick building with two wings, one hundred and eighty feet long and fifty-four feet wide . . . There are at this time ninety-five scholars, and many of the most eminent men in Congress had their education there . . . One of the young collegians supped with us; his conversation was, to be sure, not of the classic kind, but much, however, like one of our own Oxonians: Bacchus and Venus were the only topics. He, however, informed us that a person could lodge and board well in that town for two dollars a week . . .

though travellers and strangers are generally charged twice as much."

The gifts of Mr. MORGAN have been numerous, interesting and valuable, and include a remarkably fine copy of the *Editio princeps* of Aristotle (Venice, Aldus, 1493-8, 5 v.)—a special delight to book-lovers as an example of beautiful book-making, and this copy in particular, on account of its exceptionally perfect condition. Much the same may be said of the neatly rubricated edition of Terence and his commentator, Donatus (Treviso, 1477). An edition of St. Thomas Aquinas (Venice, 1480), although Mr. MORGAN speaks somewhat deprecatingly of its value, is most attractive to the layman in Bibliomania. It is printed in gothic type, and the initials are filled in in red and blue. Besides the above, Mr. MORGAN's gifts include nearly all the publications of the first year of the Aldine press. Another work which has been given, but has not yet been sent to the library, will equal if not surpass any of the others in interest—the first edition of Plato in Greek (Aldus, 1513). Altogether, Mr. MORGAN's gifts have nearly or quite doubled the total previous stock of the library in the matter of monuments of early printing. He has also contributed to the very newest as well as to the very oldest literature, by stocking the biological laboratory with an admirable collection of technical biological periodicals, which, in the form of bound volumes, will ultimately find their way into the general library. A more detailed account of the books given by Mr. MORGAN will some time be published in another connection.

It is to be regretted that the library has almost no facilities for the proper exhibition of such books, but some temporary expedient, such as limited space will per-

mit, will be put in operation before commencement.

The practical interest shown in the library by these various givers (or more exactly these givers themselves, by their direct presentation of the matter to their friends) is having a distinct tendency to increase the number of systematic givers. Several others have already promised to contribute from time to time, and still another has expressed his desire to do this in the form of a small annual cash contribution to be expended by the librarian, giving it as his opinion that others of his friends would be willing to commute a systematic gift of books into a similar cash gift, or to give both. There are two or three collections which are only waiting until there shall be room to receive and properly care for them. It is hard to say which the library needs most—an extension of the building or more books; but it is certain that a new building would bring more books, and probable that enough more books would influence some one to provide a building.

The purpose of this article has been simply to mention recent systematic gifts which have been especially notable. It ought to be mentioned, however, in this connection that various alumni present regularly their own publications, and that quite a number of the professors give volumes every now and then.

It should be said also that the considerable number of books received from Miss

CAROLINE MAY last summer, represents the spirit of alumni interest in the library, in that it was made through the intercession of C. C. CYULER, Esq., '79.

Finally, it should be noted that the CLASS OF '82, whose gift to the library has been noticed in the BULLETIN, has entered the ranks of systematic givers by the deposit of a sum with the treasurer for investment, the interest of which will add a number of books annually; and that the CLASS OF '78 has voted a considerable gift and endowment in the departments of Chemistry and Engineering. Among the visions cherished by those actively interested in the library is that of a systematic giving, by which each class for a series of years shall choose each a department for endowment as their decennial gift, and in which each individual member of the class shall take a systematic interest ever after, building it up by individual donations of books and cash, and increasing the general endowment by gift or bequest, or creating particular foundations within the class, as *e. g.*, a foundation on Roman Law within the library of jurisprudence. At least, if all graduates who are interested in books would take the same interest, according to their means, as the donors mentioned above, it would give a great impetus to the solid growth of the library, and stimulate individuals who can give largely to give to their largest ability.

E. C. RICHARDSON.

ORIGINAL CONTRIBUTIONS.

A RECENT ANALYSIS OF PELE'S HAIR AND A STALAGMITE FROM THE LAVA CAVES OF KILAUEA.

By A. H. PHILLIPS.

The specimens were collected by Prof. Libbey last summer, during his trip to Ha-

waii. In both cases the finely-powdered substance was dried at 100° C. On subsequently igniting, the stalagmite became reddish and increased in weight, due no doubt to the oxidation of the ferrous iron present.

	Si O ₂	Al ₂ O ₃	Fe ₂ O ₃	Fe O ₁	
Pele's Hair,	56.76	14.75	2.89	9.85	
Stalagmite,	51.77	15.66	8.46	6.54	
MnO ₁	P ₂ O ₅	Ca O ₁	MgO ₁	Na ₂ O ₁	K ₂ O ₁
.41	.26	11.05	6.54	2.70	.88
.82	—	9.56	4.95	2.17	.96
				100.09	100.89

The above analysis of Pele's Hair does not differ in any essential respect from that of Prof. O. D. Allen's,* but there is quite a large difference, both in the amount of alumina and potassa, when compared with that of D. E. Cohen.† In the latter the alumina is only 9.14 %, while the potassa reaches 3.06 %. These variations may be explained by the fact that the fused charge of Kiluaea is drawn off every few years by some subterranean channel, and is slowly refilled by a new supply. The stalagmite was of the kind so characteristic of the lava caverns of Kiluaea and Mount Loa. While it has not been possible to find an analysis of a stalagmite with which to compare it, but, in comparison with that of Pele's Hair, their similarity is very striking, differing from it not as much as the several analyses of Pele's Hair do among themselves, with the one exception. The iron in the stalagmite has been further oxidized, but even here the Fe O exists in larger proportions as compared to the Fe₂O₃ than it does in magnetite, and could still undergo considerable oxidation before it would exist, as would be indicated by the formula Fe₃O₄. Both from the physical characters and chemical composition of these stalagmite, it seems impossible to think of them as being formed from solution alone. Some other cause must be

sought for as the chief factor in their formation. They are almost without exception both stalactites and stalagmites, porous and vesicular, though being quite solid on the surface, while the stalactites are nearly of a uniform diameter throughout their entire length, which in some cases may reach thirty inches—two characters very hard to find, if at all in a stalactite known to be formed from solution without doubt. The stalagmites in particular are suggestive of fused drops, which, falling one on the other, are at the same time sufficiently plastic to be quite firmly welded together and congeal in a slightly drooping position; while gases liberated internally, and being kept there by the more viscous external portion of the drop, would form the vesicles. Then, too, the condition of the iron oxides point to some other mode of formation than that of pure solution. For certainly a solution of ferrous iron flowing in a thin film down the sides of a stalactite, and dropping from its point to the stalagmite, would be oxidized to a far greater extent than the analysis shows. Unless surrounded by an atmosphere strongly reducing in its character, the ferrous iron would pass over to the ferric state. True the analysis by J. C. Jackson, given by Brigham, contains no ferrous iron, but then this was of a solid stalactite, which may have been one of solution. Again, any solvent must show some selective character in the substances it dissolves; but here all constituents are carried down to the stalagmite in the same proportions as they exist at least in Pele's Hair. I hope soon to be able to draw a closer comparison by making an analysis of a stalactite and the lava from which it is supposed to have originated by solution. In all probability they will show no marked differences, but everything will be found in the same proportions in each.

* American Jour. of Sciences, 1879, 3d series, xviii, p. 134.

† Quoted in "Characteristics of Volcanoes," Dana, p. 348.

What the principal factor in the production of these peculiar formations is appears to be somewhat in doubt. If they are not formed while still in a fused or plastic state, they are certainly formed by some other means than by solution.

THE INFLUENCE OF BYZANTIUM UPON ROME.

By A. L. FROTHINGHAM, Jr.

Byzantine studies have not yet been systematized after the fashion of the Classic, Early Christian and Mediaeval periods. Under the title "Byzantinische Desiderata" Spyridion Lambros has shown in the recently established *Byzantinische Zeitschrift* (1893, p. 1, sq.) what are the most crying needs in this field, that order and knowledge may take the place of the present partial and chaotic misacquaintance. Lambros, however, leaves archaeology and art out of his suggestions. The following notes, preliminary to a fuller publication, are intended to bear upon that part of Byzantine studies that concerns the influence exercised by Byzantium upon Italy and especially upon Rome between the sixth and the tenth centuries. Although the artistic evidence here plays the principal part, my especial object is to ascertain if possible what circumstances if any existed in Italy to make possible the creation there of a Christian Hellenic atmosphere suited to the development of Byzantine art. We have as yet no adequate treatment of the whole of Byzantine history, no corpus of inscriptions, of monuments or of laws, no complete study of manners and customs, of the relations—commercial, social, political and artistic—between the East and the West. Consequently it is still possible for writers to take diametrically opposite grounds—some making Byzantine influ-

ence almost paramount in the formation of the Western civilization of the Early Middle Ages, while others deny that there is for the West any Byzantine question at all. In order that a true judgment may be formed it seems as if the following points in the domain of the fine arts required careful study; (1) a preliminary definition of the domain of art common to pre-Byzantine Early Christian art in both East and West; (2) a definition of the various phases in the development of Byzantine art considered both in its general history and in its distinct schools; (3) the making of a corpus of Byzantine monuments grouped about the few examples whose date is certain; (4) a study of the connection between the Fine Arts and the other branches of Byzantine civilization; (5) a study of the contents or subjects of Byzantine works of art, or the inner history of Byzantine iconography with its symbolism, its idealism and its changes. Until now there has been no attempt, even, to write the history of Byzantine art either as a whole or in any of its parts, with the exception of Kondakoff's work on illuminated manuscripts. In so far as the relation of the East and West is concerned it seems to me as if the questions of style in figured compositions had been too exclusively studied, to the neglect of these three points, to which attention should be especially directed: (1) A clear distinction between genuine Byzantine and pseudo-Byzantine, especially Italy-Byzantine, works; (2) a comparative study of decorative motives and designs; (3) the determination and investigation of Byzantine centres in Western Europe, especially of a resident Byzantine population or institution.

In the present conflict of opinion I am a Byzantine partisan. In the first place I believe that Christian art owes to Byzantium its organization as an important fac-

tor in the general growth and as second to none in its influence upon the masses; that it owes to Byzantium the creation of the greater part of its subjects, types and symbolism,—the best of its stylistic form as well as its inner significance.

In Prof. Springer's introductory essay on Byzantine art prefixed to Kondakoff's History of Byzantine miniature painting, lately published, we find an authoritative exposition by one of the best known of contemporary historians of art, of which these notes are mainly a rebuttal. Springer's opinion is that Byzantine art is local like the art of other peoples, that it did not overstep its natural limits except in such cases as that of certain provinces of Southern Italy through temporary political annexation. He denies any influence over Western Europe before the XI century, with this one exception, and he makes the same denial for the XI and following centuries, in all branches of architecture, sculpture and painting. He finds this opinion on the *a priori* ground that Byzantine art—like the art of other peoples—was indissolubly connected with the Oriental and Greek genius, could flourish only in congenial surroundings where ecclesiastical institutions, ideas, customs and language were all in harmony with it. Such surroundings he does not find to have existed in Western Europe, except very temporarily in a few places like Venice and Sicily. Venice he says was completely isolated and without influence. In Sicily he claims that the Byzantine influence was thrown off soon after the Arab yoke was removed, and in support of this he cites the system of mosaic decoration during the XII century which is identical in Palermo and Rome, proving to his mind the fact that Roman influence overpowered the Byzantine even in distant Sicily.*

My conclusions are diametrically opposite to those of Prof. Springer. Accepting most emphatically his contention that art is an integral part of a civilization and a growth that cannot be grafted on to a foreign tree, I believe it is an easy task to prove the existence at various points in Italy during the period between the sixth and the twelfth centuries, of centres of Byzantine civilization possessing the necessary prerequisites to the development of Byzantine art. Such centres were: Ravenna, the seat of Byzantine civil power in Italy until 750; Venice, which remained a Byzantine province until the ninth century; Sicily, and in Southern Italy, Calabria and the Terra d'Otranto, which were for centuries part and parcel of the Byzantine empire.

At Ravenna there was Byzantine blood in a large part of the population and the art is as purely Byzantine as that of Constantinople and Thessalonica; a large number of its archbishops were Greeks and its institutions and customs were leavened through and through with Byzantinism. The influence of Ravenna was supreme in Middle Northern Italy and many were the cities whose monuments show the trace of this fact in the sphere of the fine arts. Springer grants that Venice is Byzantine, but he insists that Venice was completely isolated in her corner and had no influence; still for the early period we find cognate monuments in many places on the mainland. I can cite, furthermore, two examples unknown to Prof. Springer, of the fact that Venetian artistic influence penetrated so far as Rome between the XI and the XIII centuries. (1). The sculptor, *Ioannes de Venetia* signs, in characters of the XI or early XII century, the sculptures of the main doorway at S. Maria in Cosmedin at Rome.

(2). On Jan. 23, 1218, Pope Honorius III writes to the Doge thanking him for having already furnished a mosaicist for the new mosaic in the apse of S. Paul outside the walls and requesting that more be sent from Venice to Rome. A few years before, Innocent III had decorated with mosaics in a similar style the apse of S. Peter, where the Greek inscriptions betray the Byzantine hand. Thus the apses of the two greatest basilicas in Rome were decorated by Byzantine artists, in one case certainly, in the other probably, from Venice. Add to this the tradition that the mosaicists of the baptistery at Florence, at the close of the XIII century were taught by Greek artists from Venice. As for Sicily and Southern Italy it is sufficient to be but slightly acquainted with the facts to know that a large part of their population was Greek; that the Byzantine emperors in the IX and X centuries, in order to strengthen their hold upon Italy sent three large colonies from Greece; that Calabria and the Terra d'Otranto were more thoroughly Greek than many Eastern provinces and preserved to a great extent Greek religious rites, Greek language and customs, down to the time of the Renaissance, notwithstanding desperate onslaughts of Popes and kings. It is certain that in these parts of Italy Byzantine art was in every way entitled to flourish. But I come now to the last point mentioned above in the *exposé* of Springer's opinion, namely, the opposition of Mediaeval Roman to Byzantine art and the displacement of the latter by the former in Sicily in the XII century, as illustrated by the system of mosaic decoration. My answer is two-fold; (1) the identity between the Roman and Sicilian decoration not only does not prove Roman influence but, on the contrary, it can be shown to prove the reverse, for both Sicilian and

Roman decoration are but a part of a general Byzantine decorative system which originated in the East and was adopted wherever Byzantine influence was paramount, being introduced almost simultaneously into the Sicilian and Roman schools. In this respect at least Roman art is in dependence on, not in opposition to, Byzantium, and Sicily, in so far as this vaunted proof of its change is concerned, remains Byzantine during the XII century. (2) Furthermore, I think it can be proved that this general idea of the opposition of Rome to Byzantium is a mistaken one; that on the contrary, the Eternal City was during all the Early Middle Ages thoroughly permeated with Byzantinism in every phase of its civilization and life. This last statement will, I know, sound somewhat preposterous and yet specialists like Comm G. B. de Rossi speak of Rome during the seventh century as a Byzantine city. Let me begin with the first point—the system of mosaic decoration. During the XII and XIII centuries the churches in the Roman province, the Neapolitan province and Sicily were magnificently decorated in a fashion new to Europe; pavements, wainscots, altar-tabernacles, choir-screens, pulpits, paschal candlesticks and choir-seats were all executed in a style of mosaic decoration which I have already described in this BULLETIN (1894, No. 1). The Byzantine origin of this system has not been, to my knowledge, suggested: I am only beginning to collect evidence in its favor and owing to distance from the monuments, speak yet somewhat diffidently of specific proofs. Still I will enumerate as Oriental examples of similar work, often anterior in date to any Italian examples: several Coptic churches at Cairo (IX-X cent.); the convents of Daphne (XI) and of S. Luke on Mt. Helikon (XI) in Greece; some of the convent churches

at Mt. Athos (X-XII); the church of the Saviour, now the Kachriye Djami, at Constantinople (XIII). I would suggest that the system was introduced into Italy mainly by the Greek Basilian monks. Their great monastery founded in about 1000 at Grottaferrata near Rome by S. Nilus, perhaps the most famous Greek monk in Italy, may have been the means of introducing it into Rome. This fact is confirmed by the fragments of the original mosaic pavements still existing and by some fragments of decorative work with Greek inscriptions. Then in 1066, the Byzantine artists sent from Constantinople introduced it into Monte Cassino and thence into other Benedictine monasteries.

The pavements of such churches of Greek monasteries as S. Maria di Terreti, in Calabria, show how the style spread in the South by means of Basilian monks. The second point remains to be proved, viz., the permeation of Rome by Byzantinism during the Early Middle Ages. This process commenced in the early part of the sixth century, but it was not until the Gothic wars between 535 and 553 made Rome desolate, killed off her Senate and upper classes and reduced her population at one time to about five hundred; not until then was the Roman tradition broken. When Rome came to life again it was under changed circumstances. Belisarius and Narses had exterminated the Goths and brought nearly all Italy under Byzantine rule, and Rome was governed by the Exarch, the Emperor's lieutenant, whose seat was in Ravenna. Byzantine officials, Greek monks and prelates, Byzantine traders and merchants, flocked to the Eternal city and occupied a quarter not yet invaded by Christians—the Aventine and Palatine hills and the neighboring bank of the Tiber. Thus did

Eastern Christianity lay a strong hand upon the Palace of the Caesars and the centre of Pagan worship, and Christian churches were for the first time erected in this part of Rome. Here was the port—here were the quays of Rome, and as this Greek quarter increased in size and importance the other quarters of the city lost importance. The Greeks soon obtained the upper hand in the higher clergy and the Papal court, in the monastic sphere, in the secular administration, in general culture and in trade and commerce. The majority of the Popes and upper clergy of the seventh century were Greeks.

The elaborate hierarchy of the Roman court was established on Byzantine models. The Popes' elections were not valid until approved by the Emperor or Exarch. The Byzantine Dux with the Roman army established his headquarters in the very palace of the Caesars; in it was the imperial chapel of S. Cesareo where were placed the images of the Emperors sent over from Constantinople immediately after their election. Near at hand was the *titulus* or church of S. Anastasia, which came next to the two great urban basilicas of the Lateran and S. Maria Maggiore and where the banners of the quarters of Rome were kept, for it was the starting place of several great religious processions. It was the principal church of the Greeks, but near by was the church which became, as time went on, the centre of the Greek population, S. Maria *in Schola Graeca* or *in Cosmedin* to which was attached the *Schola Graeca*, the great guild to which all Greeks in Rome belonged. Scattered over the Aventine and Palatine were many Greek churches and monasteries and still more were dotted through the city. A partial enumeration of those founded between the sixth and the tenth century will give some idea of the preponderance of Greeks in

the monastic world of Rome. S. Anastasia, S. Georgio in Velabro, S. Cesareo, S. Maria in *Schola Greca*, S. Erasmo, S. Saba, S. Andrea, SS. Stefano and Silvestro, (now S. Silvestro in Capite), S. Lucia *de Renatis*, SS. Stefano e Cassiano, S. Prassede, S. Maria in *Campo Martio*, S. Giovanni in Capite, S. Balbina, S. Alessio, S. Prisca, the monastery called *Boetianum*, S. Maria in *Blachernas*, S. Anastasio, S. Gregario *Greccorum*, S. Pantaleo, S. Basilio, etc. With the intervention of the Carlovingian dynasty in Italy at the close of the eighth century, the political sovereignty of Byzantium over Rome departed, but it would seem as if in certain ways Byzantine influence rather increased than diminished in certain spheres during the ninth century. This was especially the case with monasteries and art. The ninth and tenth centuries, after the Iconoclastic struggle between the Imperial and the monastic powers had been closed by the victory of the latter, saw the apogee of Byzantine monastic power and glory. This reacted upon Italy. Rome felt it even as late as c. 1000 when S. Nilus came up from Calabria and established at Grottaferrata, at the gates of Rome, a great monastic institution which was the advanced bulwark of Byzantine culture in the West, a centre of religion and of art.

What were the effects upon art of this Byzantine supremacy which lasted in Rome from the close of the sixth well nigh until the eleventh century? Byzantine art was entirely in the hands of monks. A large Basilian monastery meant ateliers for painting and mosaic-work, for decorative sculpture, the writing and illuminating of manuscripts, the weaving and embroidering of figured hangings and sacred vestments, the working of reliquaries, sacred vessels and book-covers in ivory, metal and sometimes in enamel. It meant also

a school of religious music. The supremacy of the Roman school of church music in the West during the early Middle Ages is well-known. From it went out teachers who founded the schools of music in Naples (under Bishop Stephanus, 766-67) in England (one John came from Rome in 678), and in the Frankish Empire (two Roman singers sent to Charlemagne and placed by him at the head of schools at Metz and Soissons). But I do not believe that the important, perhaps paramount share taken by the Greek monks in the establishment and continuance of this school in Rome, has ever been brought out. And yet the following would go far to prove this fact. In most of the cases in which the establishment of a Greek monastery in Rome is mentioned by the *Liber Pontificalis*, the reason given for it is that the praises of God may be sung by them day and night after the Greek manner. One text may be quoted as an example. It refers to the building of the magnificent church and monastery of S. Prassede by Pope Paschal II (c. 820): *construxit . . . cœnobium . . . in qua et sanctam græcorum congregationem aggredians, quæ die, noctuque Græcæ modulationis psalmodiæ laudes omnipotenti Deo . . . sedulo persolveret, introduxit.* The *schola cantorum* of the Vatican was recruited from promising boys whose voices were noted in the various *scholæ* or associations of the city when public processions gave occasion for grand choral singing. That the Vatican *schola cantorum* was partly trained by Greeks is made probable by their use of Greek hymns on public occasions, including the processional ceremonies and such religious services as that in commemoration of the Last Supper at the Lateran. Outside of this Papal *schola cantorum* the principal body of singers seems to have been the *Schola Greca* itself, which was the body selected in great festivals to fur-

nish the music. This continued to be the case as late as the time of Otho III (983) as is shown by the text of a hymn then written which describes the feast of the Assumption of the Virgin, on which occasion it says: *Dat schola graca melos et plebs romana susurros.* Greek hymns were also sung by the public. The *Liber Pontificalis* states that when Louis, son of the Emperor Lothair entered Rome with his army, he was received outside the gates by the Romans divided into their guilds or *scholæ*, and the military *scholæ* into which the Roman army was divided sang hymns of welcome, some of them singing the *Greek imperial hymns (Græcas imperatorias laudes decantantes)*, a fact which shows how late there remained a Byzantine element in the Roman army.

A very brief summary of the effects of Byzantine influence upon Roman art is all that can be given here. In architecture, here as elsewhere in the West, the Byzantine artists were obliged to retain the basilical form which the East very soon discarded. With this exception it may be said that all branches of art were either partly changed or entirely revolutionized by the Byzantine artists from the seventh to the eleventh centuries. That this was the case with the decorative sculpture that filled all the Roman churches has lately been proved by Cattaneo (*L'architettura in Italia dal VI secolo al mille*). The style of ornament in very low relief or in open work executed by the hand either of Byzantine artists or their Italian pupils can still be studied in such Roman churches as S. Maria in Cosmedin, S. Maria in Trastevere, S. Lorenzo fuori-le mura, S. Giovanni a Porta Latina, S. Clemente, S. Agnese, S. Sabina, S. Giovanni in Laterano, S. Prassede and S. Giorgio in Velabro. These remains are fragmentary because the decoration of the Roman churches

was entirely renovated in a new style in the XII and XIII centuries. But, between the VII and XI centuries there was no other style than the Byzantine in Rome. There remain such branches of painting as mosaics, wall paintings and textiles. The Byzantine supremacy in the two former branches is well-known and only at times is there a trace of a native element. In regard to textiles I want to suggest a solution of a puzzling problem. The popes of the eighth and ninth centuries regarded as their most magnificent gifts to churches the sacred vestments, veils, altar-fronts or covers, and hangings, embroidered with ornaments and religious subjects, which they gave away in great profusion. The monopoly of Byzantium in this branch of art, and the great value that was attached to them in the West, where they were not made, has led critics to suppose that these thousands of pieces given by the Popes to Roman churches were all imported from the East. Only Gregorovius has seen how absurd a supposition this is, and suggests that they were made in Italy by some Byzantine artists flying from the Iconoclastic persecutions. In my opinion they were made in the Greek monasteries in Rome —some are known to have come from the Greek nunnery of S. Maria in *Campo Martio*. My main reason is that the *Liber Pontificalis* describes each piece in detail in technical terms that are in nearly every case Greek terms transliterated in Latin; the writer of the Papal chronicle, ignorant of Greek, must have relied upon descriptive documents such as would be handed to the Papal treasury by Byzantine artists working in the city who transliterated their terms into Latin in these lists. This theory is confirmed by the term *fecit* for *fieri fecit* which is used in describing the gifts. This implies that the textiles were

ordered by the Popes to be made for the churches to which they were given, and could hardly be applied to importations.

Rome had colonies of several nations each grouped in a small quarter around its national *schola*; there were the Franks, the Frisons, the Saxons and the Lombards—not to mention a Jewish quarter and one occupied by emigrants from Ravenna. These were regarded as foreigners, but the *schola grecorum* and the entire Greek population became so integral a part of Rome and took so large a share in its development that it was looked upon as part and parcel of the city. This period of Rome's history is very obscure and the subject has not been carefully investigated. It is interesting to note such glimpses of the real importance of the Greek colony as that which shows us the two founders of the Anglo-Saxon church to have been members of it. The first primate of England, Theodore of Tarsus, was a resident of Rome and a member of the Greek colony. The appointment was previously offered by Pope Vitalianus to Hadrian who was abbot of the *schola grecorum* at S. Maria in Cosmedin. Although he declined the honor he accompanied his friend and fellow-Greek, Theodore, to England in 668 and assisted him in organizing the Anglo-Saxon church. These two men carried with them Greek learning as well as Roman, the methods of Greco-Roman church music and a considerable number of Greek manuscripts. It may therefore be said that the Anglo-Saxon church had a semi-Byzantine origin; for Benedict Biscops, the

founder of ecclesiastical culture in the North of England through his monasteries at Weremouth and Yarrow, was influenced by the Greek colony in Rome, was a friend of Theodore and brought from Rome Greek manuscripts and Byzantine paintings.

The conclusion of these brief notes, for which nearly all the proof is here omitted through lack of space, is that during four or five centuries Rome assimilated so large an element of Byzantine civilization that its atmosphere was in every way suited to the development of a form of Byzantine art, and that when the revival took place in the twelfth century there grew up an art in Rome which combined both classic and Byzantine elements, the classic element being embodied in the architectural forms and the Byzantine especially in the mosaic decoration above described. There could, therefore, have been no opposition or contrast between the two styles, as who can doubt who has compared such works as the beautiful mosaics at S. Maria in Trastevere executed by the Roman artist Cavallini with contemporary Byzantine works of exactly the same style.

Greek was always regarded in the Church as the language of religion, and so it was natural, during the early Middle Ages, that Greek artists and the Greek style should be considered to be the best expositors of art which was then but the embodiment of religious beliefs and doctrines for the edification and instruction of the people.

SUMMARIES OF PAPERS READ.

LITERATURE AND FAITH.

By T. W. HUNT.

After a brief history of opinion on the topic in question, Professor Hunt proceeded to discuss the grounds and forms of that relationship which is seen to exist between these two provinces of thought and expression. Special emphasis was laid on the evidences of this relation in poetry, prose fiction and miscellany; on the attitude of such critics as Stedman, Arnold and Shairp respecting it, and on those recurring periods in English and Continental Letters when any such relation has been denied or ignored.

The connection between an unsacred philosophy of life and an unsound literature was shown, as evinced in Clough and Swinburne, and the remedy suggested by which truth and faith might be made more pronounced in modern prose and verse.

[Abstract of paper read in Philadelphia, March 5.]

THE MECHANICAL CONCEPTION OF NATURE.

By GEORGE MACLOSKIE.

The general outcome of scientific discovery has been to reduce ever increasing portions of nature under the control of physico-chemical law. Newton's work, enlarged by Laplace and by the spectroscopists, has done this for the heavens, as expressed in the nebular theory. The geologists have reduced the crust of the earth to the reign of uniformity, though not of uniformitarianism. The chemists and physicists have taken in inorganic nature, and have also carried the conquest into a great part of the organic world. The progress of physiology has tended to show that

processes within the animals and plants are largely physical; and Darwin has attempted with considerable though not complete success to bring within the same category the problem of the production of new species. Thus has science transformed our ideas from supernatural production into a course of natural evolution. There are irreducible cases; as the origin of the human soul and of morality; and even the origin of the human body is still a puzzle, the latest of our evolutionizers (Topinard) arguing that it cannot be derived from monkeys, and that we must go lower down and search for its origin with the Lemurs. The first origin of life itself, and of animal and vegetable organization, and still earlier the original production of matter, are irreducible cases. Nobody understands any of these, and few pretend to understand them; but there are some who think that even these cases if fully known would be found consonant to the universal laws of nature. Their conception of nature is entirely physical or mechanical.

Now this view is supposed by many writers to be essentially atheistic, and its progress has been the occasion of repeated controversies. It may be held in an atheistic sense, and has the recommendation to some that it does not bring a Divine maker into the foreground. But the ablest thinkers acknowledge that it is really and strongly theistic. It is of the non-living part, of the purely mechanical part, that Scripture says "The heavens declare the glory of God." The truth of the 19th Psalm is pledged to the doctrine that physical phenomena, as well as vital and mental phenomena, testify of a Divine author; and if the human soul were only a metakinetie aspect of physical matter and energy, men would not be entitled to argue

that such mechanism can come into existence without an Inventor and Maker. Even a badly working mechanism may not be relegated to the dysteleological limbo of being denied an author. However men may explain the origin of things, there is no possibility of science explaining them so well as to dispense with faith in God.

Nor ought the mechanical conception of nature to weaken faith in the Biblical record. We can still say that God made the heavens and the earth, though we may believe that His work was effected by the employment of physical forces. As believers in the Bible we agree with the agnostics as to the uniformity of nature; "the ordinances of heaven" is the Bible name. We even agree with them in condemning miracles as incredible in the ordinary course; but we do not think it incredible that the Maker of All having produced creatures like Himself in intelligence and moral character, should communicate His will to them, and should confirm His extraordinary intervention by using the forces of nature in a unique or miraculous way. If miracles were not of this exceptional character their value would be lost. We also condemn as unscientific the efforts to banish the idea of Design or Purpose from nature. People have sometimes abused such an idea; but purpose forces itself on our attention everywhere. All physiology is dealing with the uses and purposes of organs and is intensely teleological. Sachs, the eminent Botanist, protests against the fanaticism which would banish from science the term and the idea of purpose; and Huxley concedes that the Darwinian system has brought back Teleology into Science.

Thus if we could concede that the mechanical theory is provisionally established, save as to the origin of matter and organization, and life and mind; we

find that it tends to fortify evidence for design and for theism, and is not necessarily materialistic; it may favor naturalistic interpretations of the narrative of the cosmogony, the deluge, &c.; it illustrates the miracles of Scripture by showing that they must be a unique case, and must stand or fall along with redemptive revelation; it will not weaken faith in personal immortality, as the phenomena of ether and light show how provision may be made for unexpected changes; but it may favor the opinion that the human soul is derived from and dependent upon some physical substratum. Whilst recognizing God's control over all things, we do not see in this any disturbance of natural law; nor do we expect ever to understand how He operates upon nature. We can operate upon our body and upon the external world; but we cannot tell how. The fact of the Divine intervention is equally credible; but its mode must for ever be inscrutable.

[Abstract of a paper read before the Victoria Institute, London, Feb. 19, 1891.]

AMPHIUMA TRIDACTYLA.

By ALVIN DAVISON.

Cope, in his *North American Batrachia*, has sought to show the affinity of *Amphiumidae* and *Coeciliidae*, by pointing out in each family the possession of an ethmoid bone, which Hay and Kingsley have clearly shown to be wanting in the skull of the former family. The bone which Cope, as well as Wiedersheim before him, has called ethmoid, is merely a backward septal extension of the premaxillaries. Furthermore, the squamosal, whose length in *Amphiuma* is perpendicular to the long axis of the skull, is turned forward in such a manner in *epicrium glutinosum* as to lie nearly parallel with the skull's axis, and

therefore has been named by the Sarasins, jugal. This is another barrier to the affinity of the two forms. Cope left undiscovered the strongest evidence in favor of the relationship of these two families when he failed to point out the correct dimensions of the lungs in *Amphiuma*. He says they are about equal in length and terminate posteriorly on a level with the liver. In all my specimens, seven in number, I find the right lung nearly one-third longer than the left. The latter terminates approximately three centimeters behind the liver. Macalister states that a similar inequality of the lungs exists in the *Cociliidae*, which fact seems to me to be a valid argument favoring the relationship of these two families. In the *Journal of Morphology*, vol. iv, Hay implies that further evidence of this relationship is furnished by the similarity in the breeding habits of the two families. The young *Amphiuma*, less than 150 mm. in length, had never been discovered by any one previous to February 22d, 1894, when I secured eight specimens from 68 mm. to 95 mm. long. Since the embryos in the eggs found by Hay were 50 mm. long, my youngest specimen is probably not more than eight or nine weeks old. It has no signs of gills and no signs of more than one gill-opening. The latter is covered by a membranous valve. The limbs are proportionally as long as in the adult, and very slender, being scarcely thicker than a hair. The hind pair give evidence of separation into two digits, but no digital formation is apparent in the fore limbs. Hay reports that in his embryonic specimens the toes were much more distinctly differentiated on the anterior than on the posterior limbs. There are two rows of pores which extend longitudinally along each lateral body area from the neck to the tip of the tail. Their function or phylogenetic significance is as yet

unknown. Cope says these pores do not exist on the body of the adult, but I have clearly demonstrated them by a special preparation. They are, however, much less prominent than in the young. The anatomy of the young is reserved for a more complete paper.

Previous to securing the young I made most careful study of the muscular system of the adult, which resulted in the discovery of a peculiar arrangement of the fibres constituting the dorsal muscles. Each part of the superficial muscle included between the transverse and neural processes is composed of three series of cones longitudinally disposed. The apices of the row adjacent to the neural spines are directed posteriorly, while those of the adjoining row are turned in the opposite direction. The apices of those in the third row (distal from the mid-dorsal line) have the same direction as those in the proximal row. In all cases the apex of one cone is introduced into the preceding one about one-third of its length. The same conical arrangement prevails in the muscles beneath the transverse processes, as well as in the whole muscular mass of the tail. There are special processes on the vertebrae for the attachments of these cones numbering about twelve hundred.

Dr. Hair, in the *Journal of Anatomy and Physiology*, has demonstrated a similar conical arrangement in the *alligator*. I have observed the same structure in the New Zealand lizard (*Hatteria punctata*), and also in some large lizards from tropical America. St. George Mivart, in "The Common Frog," has pictured the cones occurring in the *Iguana*. The habits of these animals are entirely different from those of the sluggish *Amphiuma*, and therefore we must consider this characteristic cone structure of great phylogenetic importance, as will be shown in a later contribution.

The manner in which the eggs of the *Amphiuma* are fertilized has for several years been the subject of much controversy. In the early part of the Spring of 1893 I secured a specimen of this genus, a trifle over a metre in length, in Northern Tennessee. This animal was the largest of its kind on record, and was found farther north than any previously discovered. In examining the vent I found exuding a viscid substance, which, when placed under the microscope, revealed numerous spermatozoa. The inner walls of the vent were covered with dense papillæ on their posterior parts. These papillæ, under the microscope, proved to be the orifices of numerous glands which secreted the almost colorless, waxy substance containing the spermatozoa. The anterior parts of the internal vent-walls are furnished with from fifteen to twenty membranous laminae, extending obliquely from within, outwards and backwards, in such a manner as to transfer the generative products slowly from the cloaca to the external lips of the vent. When these lips are placed in apposition to the lips of the female vent, the reproductive agents are induced within the cloaca of the latter by means of a series of capillary tubes arranged on the inner walls of the female vent, and extending from without inwards and forwards. I do not see how these different features in the vent structure of the two sexes can serve any other purpose than that I have ascribed to them. Furthermore, the fact that the male was so filled with spermatozoa in the month of April, as to cause their cloacal extrusion, indicates that the time was at hand for the transfer of these reproductive elements to the opposite sex; and inasmuch as the eggs are not deposited until August or

September, fertilization must occur within the body of the parent.

[Abstract of a report read before the Princeton Biological Club, Mar. 15th, 1894.]

GHIBERTI AND THE BAPTISTERY GATES.

By ALLAN MARQUAND.

In the opening years of the fifteenth century we find in Florence two sculptors of prime importance, Lorenzo Ghiberti and Donatello; both of whom reflect the fundamentally pictorial nature of Italian art. Ghiberti began his life-work at Rimini, as the associate of an "illustrious painter." Who this unnamed master was cannot be determined, since Ghiberti's frescoes no longer exist. A mosaic painting of Ghiberti's on the exterior of Or San Michele has also disappeared; the drawings ascribed to him in a MS. in the Magliabechiana Library, in Florence, are of dubious authenticity, and the mosaic glass windows made from his designs in the cathedrals of Florence and Arezzo, are still unpublished. His work as an architect was unimportant, and his architectural writings of little value, except as an early instance of the authority of Vitruvius over the minds of Renaissance architects. His work as a goldsmith was of the highest quality, as may be gathered from his account of the mitres made for Pope Martin V. and Eugenius IV. To his skill in this direction Benevento Cellini bears testimony in his work on the art of the goldsmith.

Though these works have disappeared and some minor works have not been identified, all of the important monuments mentioned by Vasari and by Ghiberti

himself still exist, and prove him to have been not merely a perfect master of the technique of bronze casting, but an artist of high quality. His chief merit is not the pictorial quality which he shared with the painters, but the plastic character of his work, in which he surpassed his contemporaries. His panel of the Sacrifice of Isaac exhibits a more advanced sense of perspective than that of Brunelleschi, to whom is usually assigned the credit of having laid the foundations for the modern conception of perspective. As compared with Donatello's, Ghiberti's perspective is more sculptural in character; since Donatello worked in flatter planes, and hence stands nearer to the methods of the painter.

Ghiberti's first Baptistry Gates (1403-1424) follow in general the scheme of the gates by Andrea Pisano, but are more naturalistic in treatment, richer in composition and more plastic in style. These gates and the second pair (1424-1452) are evidently the work of a single mind, and the part taken in their design or execution by Donatello, Ciuffagni, Paolo Uccello and Michelozzo was insignificant. Ghiberti's panels upon the font of the Baptistry of Siena may be taken as transitional between his early and his second manner; and the three statues of S. John the Baptist, S. Matthew and S. Stephen show rapid advances in the art of sculpture in the round. Ghiberti's first manner, as exemplified by his first gates, based upon that of Andrea Pisano, shows also the influence of Giotto and his school. His second manner shows an advance in artistic composition, in the knowledge of the human form, and in general gracefulness of design. The same high quality is evinced in his reliquary of S. Zenobius. Three years after the second gates had been put in

place Ghiberti died, and was buried in the church of S. Croce.

[Abstract of a lecture given at the Metropolitan Museum of Art, March 17th, 1894.]

THE CATHOLIC AND THE PURITAN SETTLER IN MARYLAND.

By ALFRED P. DENNIS.

The early colonizers of Maryland, though sprung from a common stock, were not a homogeneous people in their sympathies and antipathies. Maryland soil had been occupied by three distinct classes of settlers before the middle of the seventeenth century. Clayborne was first in the field with his Protestant settlement on Kent Island. Profit and not piety was the greatest object in life for Clayborne. Pre-emption and not redemption gave pith and purpose to his enterprise. Between these Church of England men, backed in their possession by fair legal claims and the later Catholic settlers in St. Mary's, there was no more community of interest than is indicated in their armed conflict on the waters of the Chesapeake. Aside from the sporadic attempts of Clayborne to vindicate his property rights by arms, he and his band have no large formative influence in our early State life.

Nor was there more community of interest between the planters on the Potomac and the Puritan band that settled fifteen years later on the banks of the Severn. Five years had not run their course before Old World animosities had burst into a flame and plunged "Papist" and "Puritan" into the fiercer struggle of an appeal to arms. Distrust, prejudice, antipathy doubly sealed the commission of every actor in this struggle, yet each party represented principles complementary and significant in the splendid development of civil and religious liberty in the

Maryland Province. The Roman Catholic was tolerant in religion but narrow in politics. The Puritan was narrow in religion but in politics liberal.

A host of authorities contend that Maryland was intended as an asylum for Roman Catholics, who found upon the banks of the Potomac the Puritan Plymouth. The Puritan settlers in Maryland, and not the Catholics, were religious refugees. The purpose in the founding of the Maryland colony by the Calverts was mainly economic and not religious.

Elizabeth Tudor looked upon Catholic intrigues as a challenge to royal authority, and met them with a policy of coercion which increased in severity until the day of her death. Under James, the first of the Stuarts, the old policy of religious coercion was continued, but with the important distinction that Catholic and Puritan exchanged positions as objects of royal hostility. The political considerations which had armed Elizabeth against the Catholics turned James and his successor with equal consistency against the Puritans.

Melville, second only to Knox as a figure in Scottish ecclesiastical history, had assumed the leadership in a contest with the civil power, which culminated sixty years later in open rebellion against Charles I. Nor did the movement, essentially democratic, stay until it demanded the life of the king. Melville's doctrine of equality in things spiritual, imported from Geneva and reared on the speculative basis that all laborers in Christ are equal, had been metamorphosed into the dogma of political equality.

The democratic drift of Melville and his co-religionists had its genesis at Geneva; it was nourished in Scotland, extended across the border, spanned the ocean, and is read anew in the strife of the settlers on the Severn for political equality. As the

strength of the Puritan faction in England increased the apparently irreconcilable parties of the opposition were drawn together for common defence. Long before Puritanism had gained absolute control in the overthrow and execution of Charles, the forces of the court, the established church, the Catholics and the Arminians had practically joined hands against the common enemy. The hatred James bore to the Puritans and his natural clemency to the Catholics were further emphasized as early as 1616, when the king began negotiations for the Spanish match. For seven years these negotiations for the marriage of Prince Charles to the Spanish Infanta dragged on through the tedious mazes of royal protocols and papal dispensations.

It was precisely within these years when the penal laws against Catholics had been suspended, when scores of popish lords and knights were in the enjoyment of high public trusts, and the royal purpose pointed to a wider indulgence than had been known for half a century, that George Calvert projected his plan of western empire. Calvert's venture of a proprietary colony in Newfoundland proved a bad commercial investment. The scheme of western empire, planned for personal aggrandizement, reached its full development ten years later, when the charter of Maryland was penned.

There was no break in policy or purpose between the two grants. The whole fabric of Calvert's tardy conversion to Catholicism, built on the testimony of Fuller and Goodman, must fall to the ground. Calvert was not converted between the two grants, and did not resign his office in consequence of scruples of conscience.

He was a Catholic before his earlier plans of colonization were mooted. The acknowledgment of his faith was simply a mask to cover his defeat by Buckingham.

While the first colony was numerically Protestant, Chancellor Kent is correct when he speaks of the colony as "the Catholic planters of Maryland," and Judge Story when he says they "were chiefly Roman Catholics," and Bancroft when he writes that the religious toleration of the early period of settlement was the work of Catholics. The physical balance of power was with the Protestants, the social, political and intellectual control was with the Catholics. Court records, council proceedings, the names given to towns, to Hundreds, to creeks, to manors, all offer testimony to Catholic control.

Controversy has centered about the famous Toleration Act of 1649. Protestants as well as Catholics have claimed the honor of its passage. The early religious freedom of which we boast had neither genesis nor support in legislative enactments. Religious toleration prevailed as a habit of the settlers of St. Mary's, forceful and wholesome as an inchoate law, years before the hybrid statute of 1649 was submitted to vote.

Under the fire of persecution the Puritan exodus from Virginia began in 1648. The liberal promises of the Maryland governor led them to the shores of the Severn. They erected upon the shores of the Chesapeake a *Civitas Dei*—a Church State—to which they gave the reverential name of "Providence." They haggled at the words "absolute dominion" in the oath of allegiance, and demurred at the obedience due Roman Catholic officers.

Both sides were arming for a contest. The drama of Marston Moor was to be re-enacted in the New World. Questions were mooting far wider than the sphere of religious controversy. The principle of self-government and civil equality was at stake. The battle of the Severn was to determine whether the mediæval institu-

tion of a feudal principality should persist upon Maryland soil. The defeat of the royalists of St. Mary's was the vindication of the democratic principle in Maryland. Within a generation after the battle of the Severn the Puritan settlement, as a political aggregate, had become a memory. At the restoration of monarchy in England, the Puritan had combined with the more numerous Episcopalians and his less extreme brethren of Charles county and completely lost his identity. Yet the last word of his movement has not been spoken. From the days of the Puritan challenge to the absolute authority of a feudal lord, St. Mary's was doomed as the political centre of the province. Just two hundred years ago the theatre of the Puritan struggle received the name of "Annapolis," and was formally advanced to the political headship of the Province.

[Abstract of an address delivered on invitation of the Maryland Legislature, in the State House at Annapolis, March 5th, 1894. Occasion of the 200th anniversary of the removal of State Capitol from St. Mary's to Annapolis.]

READING FOR STYLE.

By ERNEST C. RICHARDSON.

Whether the object of reading is writing, recreation or personal improvement, reading for style is the key to all reading.

The rules for such reading are—

I. Be universal—catholic. Be broad chronologically and geographically. Be universal in the *forms* read—prose, poetry, humor, pathos, analysis, argument, description, realistic and romantic, etc., etc. Be universal in the *character* of styles read. Read for: (1) Dignity, elevation, distinction; (2) breadth, soundness, manliness; (3) grace, charm, lightness of touch.

II. Specialize, of course, on English

style. Read oldest style. Read contemporary style. Read American style.

To learn to appreciate and enjoy style, study Hunt, etc.; *read for style*, Pater, etc.

[Abstract of a lecture read before the Library Class and others at the Drexel Institute, Philadelphia, Feb. 9, 1894.]

ENGLISH IN THE PREPARATORY SCHOOLS.

By BLISS PERRY.

The most serious deficiency in the preparation of candidates for college is the lack of ability to write English that is even negatively good. While it is true that the conditions under which the pupil writes, in the entrance examination and afterward, are not very favorable, a part of the inability to compose good English is traceable to the methods of training in composition in the secondary schools. Boys are not taught to use their eyes and tell what they see. It is the eye and the hand, rather than the mind of the pupil, to which the teacher of composition ought primarily to give direction. If a boy has been taught to observe, and to record his observations in the right words, arranged in the right way, he has been taught the essentials of the art of composition. Accurate observation and a precise use of terms of form, color, sound, and motion should be made the basis of training in expression. Thus the description of objects brought into the class-room, and the narration of events in the pupil's own experience, ought to be used freely throughout the years of secondary education to secure the requisite precision and flexibility in the use of the mother tongue.

To lay emphasis upon the faithful rendering of the external fact is not necessarily to minimize the value of discipline in the expression of ideas and feelings. One

leads naturally to the other. The higher forms of discourse are bound together by relations as inevitable as the lines of a building or a statue. If a boy has been trained to describe these objects, he finds less difficulty in arranging the thoughts of an oration in logical order and constructing from the material at hand a unity which shall satisfy his sense of form. But at the beginning of a pupil's discipline as a writer the material for composition, whether it lie in the realm of facts or of ideas, should be given him. The boy's mind should be fed with great imaginative literature; but his hand should be trained to transcribe facts as the readiest method of giving him a mastery of the technic of expression.

Preparatory and college work in English must be more closely articulated. The present entrance examination paper is an unsatisfactory instrument, either for determining what the candidate has done or for indicating what the college wishes him to have done. If the weak point in the candidate's written work is his deficient training in exact observation and accurate record, the points to be guarded against in the remaining English preparation are the tendency to substitute second-hand opinion about literature for direct contact with literature, and the inclination to force upon the pupil, in advance of the normal time, critical methods for which he is unprepared. Scientific analysis of the literary product is out of place in the preparatory school. Instruction in English should be adapted to the nature of the pupil's mind in the different stages of its growth. There is no wise method of hastening essentially the gradual change from immaturity to maturity of thought and expression.

[Summary of paper read before the Schoolmasters' Association of N. Y., March 10, 1894.]

SUMMARIES OF PAPERS PUBLISHED.

THE ORIGIN OF RIGHT-HANDEDNESS.

By J. MARK BALDWIN.

This paper reports and discusses the results of a series of experiments made by the writer on his infant daughter, H., to determine the time and conditions of the rise of marked preference for either hand in reaching for objects. The experiments extended over the latter half of her first year. For details the original article must be consulted.

The results of the entire series of experiments on the use of the hands may be stated as follows, mainly in the words in which I reported them summarily some time ago:*

1. I found no trace of preference for either hand as long as there were no violent muscular exertions made (based on 2,187 systematic experiments in cases of free movement of hands near the body: i. e., right hand, 577 cases; left hand, 568 cases; a difference of nine cases; both hands, 1,042 cases; the difference of nine cases being too slight to have meaning).

2. Under the same conditions the tendency to use both hands together was about double the tendency to use either (seen from a number of cases of the use of both hands in the statistics given above), the period covered being from the child's sixth to her tenth month inclusive.

3. A distinct preference for the right hand in violent efforts in reaching became noticeable in the seventh and eighth months. Experiments during the eighth month on this cue gave, in 80 cases, right hand, 74 cases; left hand, 5 cases; both hands, 1 case. This was true in two very distinct classes of cases: first, reaching for neutral objects (newspapers, etc.) at more than the reaching distance; and, second, reaching for bright colors at any distance. Under the stimulus of bright colors, from 86 cases, 84 were right-hand cases and 2 left-hand. Right-handedness had accordingly developed under pressure of muscular effort in the sixth and seventh months.

4. Up to this time the child had not learned to stand or to creep; hence the development of one hand more than the other is not due to differences in weight between the two longitudinal halves of the body. As she had not learned to speak or to utter articulate sounds with much distinctness, we may say also that right or left-handedness may develop while the motor speech center is not yet functioning.

5. In most cases involving the marked use of one hand in preference to the other, the second or backward hand followed slowly upon the lead of the first, in a way clearly showing symmetrical innervation of "accompanying movements" by the second hand. This confirms the inference as to such movements drawn from the phenomena of mirror-writing, etc., by Fechner and E. H. Weber.

The theory of the origin of right-handedness proposed in this article connects this phenomenon with the development of speech and music ability, both of which are associated with the stronger hand in their brain seat.

* *Science*, xvi, October 31 1890: discussed by James, *Science*, November 8, 1890, by Dr. J. T. O'Connor, *ibid.*, xvi, 1890, p. 331, and by myself, *ibid.*, xvi, November 28, 1890. The report is quoted in full in *Nature*, November 13, 1890, and in part in the *Illustrated London News*, January 17, 1891. See also Ebbinghaus' *Zeitsch. für Psychologie*, ii, 1891, p. 239; Wilson, *The Right Hand: Left-handedness*, pp. 128-131; *Revue Scientifique*, 1891, ii, p. 493; discussed by Mazel, *Revue Scientifique*, 1892, i, p. 113. Both writers in the last-named journal cite these experiments wrongly as Wilson's.

It is held likely that right-handedness in the child is due to differences in the two half-brains, reached at an early stage in life, that the promise of it is inherited, and that the influences of infancy have little effect upon it. Yet, of course, regular habits of disuse or of the cultivation of the other hand may, as the child grows up, diminish or destroy the disparity between the two. And this inherited brain-oncesidedness also accounts for the association of right-handedness, speech, and music ability—the speech function being a further development of the same unilateral potency for movement found first in right or left-handedness and then in song.

[Abstract of a paper published in the *Popular Science Monthly*, March, 1894, pp. 606-615.]

ON VERTEBRATE FOSSILS FROM THE LOUP FORK.

By J. B. HATCHER.

Ælurodon taxoides, sp. nov. This genus is the most abundant and varied of the Loup Fork carnivora. The present species is about the size of the black bear and is characterized by the reduction of the metacönid on the inferior sectorial and by the shape of the mandible. The lower border is straight from the symphysis to a point below \overline{m}_2 , whence it rises rapidly to the angle, producing a shape much as in the badger.

Ælurodon meandrinus, sp. nov. This is the largest species of *Ælurodon* which has yet been discovered and is remarkable for the close crowding of the premolars, which are implanted in the jaw in a zig-zag manner.

Aphelops fossiger, Cope.

Teleoceras major Hatch. This very in-

teresting rhinoceros is the only one yet found in America with a single median horn, like that possessed by many Old World genera. The sagittal crest appears to be retained. The upper molars have an anticrochet and crista, but no distinct crochet.

Technically, perhaps, *Teleoceras* should not be considered as generically separable from *Rhinoceros* and had it been found in Europe, it would doubtless have been referred to that genus. Since, however, it is an American form, found in the same beds with *Aphelops*, its unmistakable ancestor, which belongs to a line very distinct from that of *Rhinoeeros*, it should be referred to a separate genus. This is for the reason that classification should rest as far as possible upon our knowledge of actual relationships, and should be an expression of those relationships, so far as they are understood and not form merely a convenient arrangement founded upon the similarity or dissimilarity of structure.

The collection was made by the writer in northwestern Nebraska in the Spring of 1893. In this locality only the *Equus* Beds and the Loup Fork Miocene appear on the surface. These two formations are separated by an unconformity which has hitherto been overlooked and is of importance as enabling us to clearly distinguish the two faunas, which have been more or less confused. The *Equus* Beds are, for the most part composed of loose, incoherent sands, laid down upon the eroded surface of the harder Loup Fork. In the latter were found such fossils as *Aphelops*, *Teleoceras*, *Procamelus*, *Protolippus*, *Hipparrison*, *Mastodon*, &c., while the *Equus* Beds yielded *Canis*, *Equus*, *Elephas*, *Mylodon*, &c.

[Abstract of a paper published in the *American Naturalist*, March 1894, pp. 236-247, Pl. I, II.]

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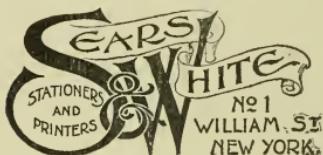
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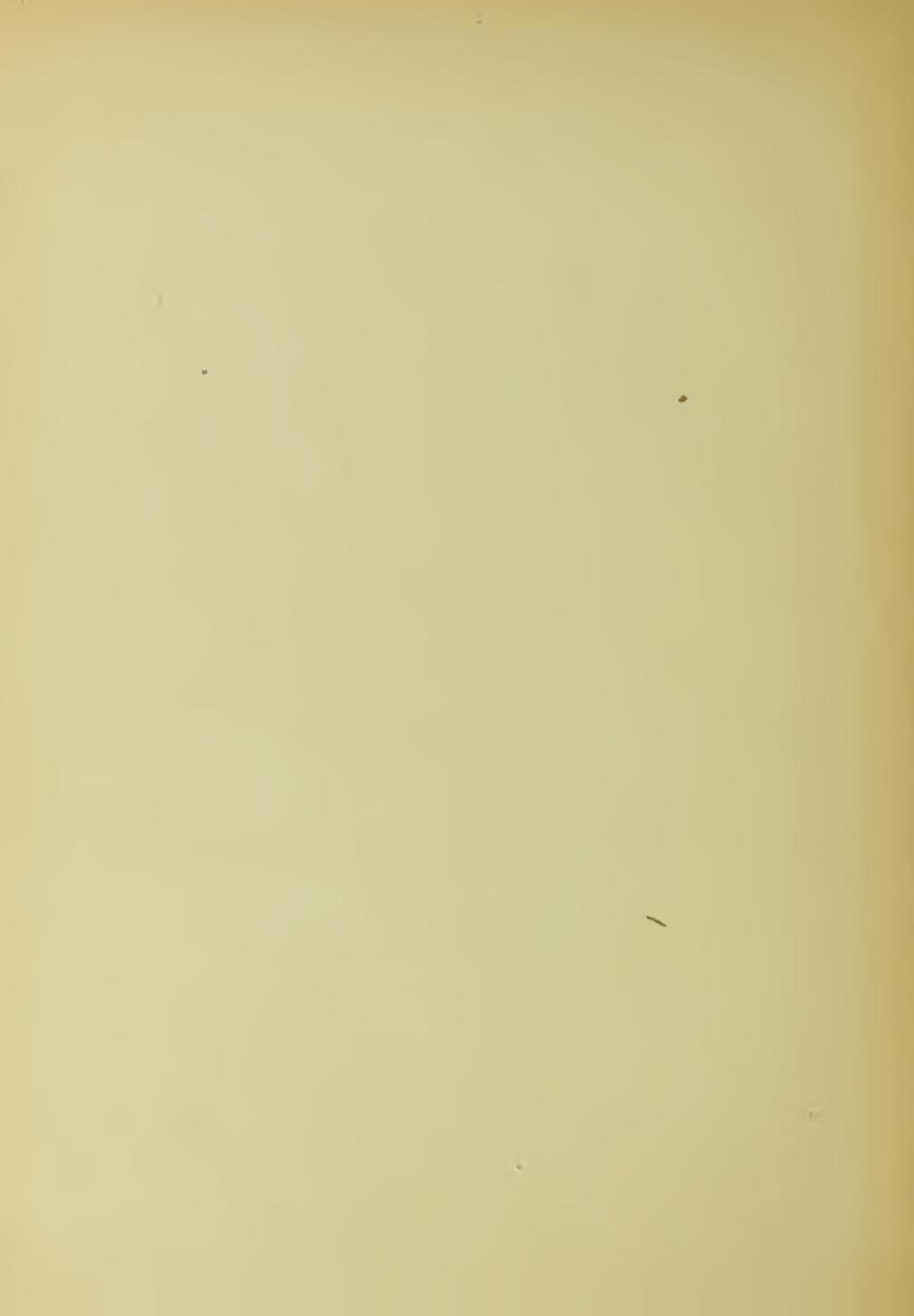
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A QUARTERLY RECORD EDITED BY
THE PRESIDENT AND MEMBERS OF THE FACULTY

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General Editor: President F. L. Patton.

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The BULLETIN is a quarterly publication. The yearly subscription is \$1.

Subscriptions should be sent to the Princeton College Bulletin, P. O. Box 608, Princeton, N. J.



THE COUBERTIN MEDAL.

PRINCETON COLLEGE BULLETIN.

EDITED BY THE PRESIDENT AND MEMBERS OF THE FACULTY

VOL. VI.

JUNE, 1894.

No. 3.

THE GOLD MEDAL FOR THE FRENCH DEBATE.

The beautiful medal, reproduced in our frontispiece, is an annual gift to Whig Hall for a Senior debate on some topic of contemporary French politics. The medal in itself is a work of art of the highest quality, designed by the sculptor O. Roty and engraved and struck by A. Desaide of Paris. On the obverse of the medal is a laurel crowned female head symbolic of the French Republic. The design and modelling exhibit a dignity of conception and a refinement of sentiment worthy of a great sculptor, and the medal has been struck in a manner which reminds us of the best Renaissance medals as distinguished from the harder mechanism of modern methods. On the reverse, within a wreath composed of oak and laurel, is inscribed FRENCH MEDAL, PIERRE DE COUBERTIN FUND, and outside of this, AMERICAN WHIG SOCIETY, PRINCETON UNIVERSITY.

The donor of the medal is M. le Baron Pierre de Coubertin, a man who comes

from the best conservative stock of France, animated by patriotic sentiments and a practical desire for the moral regeneration of his country. As yet a very young man he is nevertheless exerting considerable influence by his writings for the *Temps*, the *Débats* and the *Revue Bleue*, and by the active part he has taken in promoting athletics and purer moral standards in the schools and amongst the youth of France. With this end in view he has made a special study of English and American schools and Universities. This has brought him several times to Princeton, where he has a number of warm friends. When here he was made an honorary member of Whig Hall, in which centre of influence he desires to keep alive an interest in French affairs. Such a testimonial of international courtesy will be highly esteemed by all the sons of Princeton and win for the generous donor a hearty welcome whenever he may be able to return amongst us. The medal was won this year by James Shaw Campbell, of Pennsylvania.

ORIGINAL CONTRIBUTIONS.

A MISNOMER.

By H. C. O. HUSS.

'The evolution of criticism from the Renascence up to the present time' is the title of a book published by F. Bruneti  re, who in recognition of his critical writings was recently received into the French Academy. This title is new and striking inasmuch as we are accustomed to speak of a history, not of an evolution of criticism, and the question arises whether the term 'evolution' can justly be applied to criticism, at least to French criticism to which in fact the above mentioned book confines itself. In order to answer this question it is necessary to obtain a bird's-eye view of the leading tendencies of French criticism as traced by Bruneti  re.

We are told by Bruneti  re that modern criticism had its birth in Italy during the period of Renascence when the works of antiquity were to be classified, and that it was at first, therefore, philological. Passing from Italy to France this criticism became literary. Joachim du Bellay in his 'D  fense et Illustration de la langue fran  aise', which appeared in 1550, recommends the imitation of the Greeks and Romans.

Malherbe demanded that even inspiration should submit to logic, and always be able to give the how and the why of its fancy and caprice. Very much unlike Ronsard, who believed the essence of poesy to consist in the inner qualities of sensibility, fancy and imagination, Malherbe emphasized the outward or formal side such as order, clearness, logic, precision and regularity.

Boileau preaches the imitation of nature, but only under the guidance of reason, and emphatically recommends the

ancients simply because they imitated nature reasonably. A movement of reaction from this worship of the ancients was led by Perrault, who took up the defense of the Moderns, and the debate thus started led to the conviction that the rules and laws derived from the ancient models are not unchangeable, that there may be other models than those of antiquity, and that it is not impossible for modern authors to surpass the ancient. In other words, the belief in the absolute as represented by Boileau's rules is shaken and yields to a belief in a certain relativity in matters pertaining to art and literature. This idea of relativity triumphs with Rousseau. While literature before him had been pre-eminently the expression of the ideas and sentiments of everybody, it becomes with Rousseau the expression of the particular and private ideas and sentiments of the author. I feel in one way, reasons Rousseau, and you in another. Our ways of feeling are both legitimate because they are both natural. Only let us be natural by showing ourselves such as we are. But this means that there is no longer an ideal model or type in literature; no law or rule binding on every one; the individual is sovereign, nothing is absolute, everything is relative.

With Mme de Sta  l criticism becomes philosophical. The great advance made by her is that she no longer considers a literary work as detached from its origin, but tries to determine its relation to the state of civilization whose product it is. This, too, tends to diminish the part of the absolute and to increase that of the relative.

Villemain's chief merit is that he made criticism historical; in his 'Tableau de la litt  rature fran  aise au 18^{me} si  cle' he

traces the influence of the other nations on the national literature; now, for the first time, it is represented as European.

Sainte-Beuve in 'Causeries du Lundi' attacks the problem of what he calls "l'histoire naturelle des esprits." Starting from the fact that among human intellects, as among human faces, there are analogies and differences, he declares that the principal object of criticism must be to seek and to determine them, and that there is no other way of accomplishing this than to proceed in the manner of naturalists, that is to say, by treatment in a series of monographs. The 'Causeries du Lundi', in fact, are a collection of monographs. Thus Sainte-Beuve's chief innovation in criticism is the application of the methods of natural history to the productions of literature.

Taine, who continues the tenets of Sainte-Beuve, very explicitly states his method as follows:

"The modern method which I try to follow consists in considering human works as facts and products whose characteristics are to be marked, and whose causes are to be investigated, and nothing more. Thus understood, science neither proscribes nor pardons, it merely ascertains and explains. It proceeds like botany which studies, with equal interest, the orange-tree and the fir-tree, the laurel and the birch; it is itself a kind of botany applied not to plants, but to human works."

Thus, criticism becomes scientific.

Now the question whether the term 'evolution' in its common acceptation can justly be applied to this mass of critical literature will easily answer itself. The changes of a body in evolution, in the first place, are most gradual. There is in them no suddenness, no abruptness, no leap. *Natura non facit saltum.* But

French criticism, from being philological and exegetic, suddenly becomes literary, then philosophical, then historical and finally scientific.

Again, a body in evolution, no matter how greatly it changes, will never become the reverse of what it was; but in French criticism we meet with diametrically opposite views. Ronsard, for instance, sees the essence of poesy in the inner qualities of sensibility, fancy and imagination; Malherbe, on the contrary, emphasizes the outward or formal side such as order, clearness, logic. Boileau believes in the absolute; his successors, in the relative. Finally, the changes of a body in evolution, while they may affect its dominant characteristics, never destroy them. But French criticism whose real essence had been to criticize, as soon as it becomes scientific divests itself of this function and, with Taine, ostentatiously abstains from criticising on the ground that science neither proscribes nor pardons.

It will appear from these reasons that the application of the term 'evolution' to French criticism is not a felicitous one and that the old term of 'history' of criticism, though less specious, seems more appropriate.

DEVELOPMENT OF THE INTERVOCALIC LABIALS IN THE ROMANCE LANGUAGES.*

By EDWIN S. LEWIS.

We know already the main lines of development of the Latin consonants and vowels, we are even acquainted with the most important exceptions to these laws and with the various theories advanced to explain unusual products. We are now ready to generalize, to collect all these minute facts together, in the endeavor to discover the real cause or the causes of these different changes in speech. We already

have most of the *facts*, and to these we may constantly be adding more; it now behooves us to *explain* these facts, and to explain them in as careful and scientific a way as possible. It is no longer sufficient to say that intervocalic *b* becomes *v* in French; we should explain why the stop consonant *b* has become a fricative, and why it has not done so in all Romance languages. In this example, we readily see that, owing to the law of least action, the stop consonant has been loosened, and therefore became a fricative—a bilabial fricative, as is now heard in Spain; then, probably under Germanic influence, this bilabial fricative has become dento-labial, so *DEBERE* gave *dewere* and then *devoir*. With RIPAM, for example, we should have to go back one step further, and say that the voiceless consonant *p* became voiced, again through the law of least action, being both preceded and followed by vowels or voiced sounds. These are the simplest illustrations of my meaning that could be found; it would be more complex to explain accurately the palatalization of *bj* into *z* in *rage* from *RABIAM*, and other phenomena may perhaps never be understood.

Such investigations require a knowledge of physiological phonetics, but even they form only one step, or, more accurately, only the second step (if the collecting of facts be considered the first) toward the solution of problems every linguistic student should endeavor to solve. The third step, and, I imagine, the last, presupposes a knowledge of geography, of history, of human nature and of the thousand and one influences which are likely to affect man's speech. Having gathered all the necessary facts, having explained the countless changes from one language into another by the laws of physiological phonetics, there still remains

the important, and, in the present state of our knowledge, well nigh insoluble problem of why the same sound should give one result in one place and another in some other place. Until this problem has been carefully studied, it cannot be said that the linguistic student has done all that there is to be done in his line of work. It stands to reason that the vivacity or dullness, the depth or shallowness, the earnestness or thoughtlessness, the intelligence or stupidity of a nation must be potent factors in the development of the language; so also the geographical position of a people, whether in a mountainous or level, in a healthy or unhealthy, in a fertile or sterile locality, must have much to do with its linguistic changes. The French are logical and clear; thence a speech in which every syllable is distinctly pronounced, with a consequent partial destruction of the accent and the results corresponding to such a state of the language. The English are energetic and positive, caring little for extra sounds so long as the meaning is evident; hence a strong accent on the principal syllables, with all the wonderful changes produced by this most important element in the development of language. Foreign invasions have constantly changed the vocabulary and phonetics of a speech; so if we say, with Diez, that the French *g* in such words as *gâter* is owing to Germanic influence, we have said enough for Romance students; it would then devolve on the Germanic scholar to explain this particular hard guttural sound, apparently so characteristic of the rough life of these Northern tribes. Social usage also plays a prominent role in these transfigurations; did not the French society of the seventeenth century change *chaire* into *chaise*, and simply because it was fashionable to pronounce *r*'s like *z*'s? These are in-

fluences which may be studied in the persons with whom we are thrown in daily contact; like history, they repeat themselves. Such, then, must be the task of the linguistic student at the end of this nineteenth century.

Nothing can, however, be done in the lines I have just mentioned, until all, or practically all, the possible examples have been gathered. So I have collected all those I could find which, in the original languages, contained an intervocalic labial, either *p*, *b*, *f* or *v*, and have classified these illustrations according to their products. So far, I have only had time to work on Körting's *lateinisch-Romanisches Wörterbuch*, but as this work is the one which will yield the greatest number of examples, it may not be useless to present a few data or statistics which I have been able to gather.

I chose the labials because here the field is probably more extensive than would be the case with any other group of consonants, and also because their products, as found in the Romance languages, are unusually varied, nay, even startling at times. I have tried to separate these results into as practical a grouping as possible according to accent: 1) in this group, the labial is both preceded and followed by atonic vowels, as in Italian *dubitare* from Latin *DUBITARE*; 2) the accent immediately precedes the labial, as in Italian *débito* from *DEBITUM*; 3) the accent follows, as in Italian *robusto* from *ROBUSTUM*. Then these examples have been divided according to whether the labials are single, as *p*, *b*, *f* and *v*, or are double, as *pp*, *bb*, *ff*, *vv*, or are followed by an *r*, as *pr*, *br*, *ppr*, *bbr*, etc., or by an *l*, as in *pl*, *bl*, *ppl*, etc., or by an *i*, as *pi*, *bi*, *ppi*, etc. We have thus 32 combinations, which however should be multiplied by three, as each may be either preceded or followed by the accent,

or may be found between two atonic vowels; so we have 96 principal groups of labial consonants. In addition to these, I have included examples in which the single labials or double labials are either preceded or followed by an *h*, also various combinations of the labials themselves, as *bv*, *pf*, etc.; and, furthermore, all these last may be followed by an *r*, an *l* or an *i*. We are not therefore surprised at discovering 85 different results in the Romance languages, of which some 30 or more are very common.

I shall now draw a few general conclusions from these tables, showing to what use they may be put. We find that a voiced consonant is more likely to degenerate than is a voiceless consonant; by degeneration I mean the development of a voiceless into a voiced consonant, of the stop into a fricative, and, finally, the complete loss of a fricative. So out of 12 examples in which *p* is intervocalic, in only 4 or 5 will it become *b*; it hardly ever disappears, and in 7 or 8 it remains *p*, in any of the three accent-groups, that is, atonic vowel + *p* + atonic vowel, tonic vowel + *p* and *p* + tonic vowel. With *b* the results are decidedly different, as out of 12 examples, *b* remains in only 5, becoming *v* in 4 and disappearing in 3. This is probably explained by the fact that the intervocalic voiceless *p* is more distinctly heard than the voiced *b*, because of the sudden cessation and following resumption of voice, and therefore people are more likely to keep this consonant intact. In the case of *b*, however, the voice runs on smoothly, and the degeneration of the consonant takes place unconsciously to the speaker. It is on this principle that I should explain the development of *PARAVEREDUM* into the French *palefroi*, instead of *palevroi*; the latter, *palevroi*, is a word without character, if I may so express myself, be-

cause of its large number of vowels and voiced liquids; *palevroi* would soon degenerate into something like *palroi*. In order to preserve the full worth of this word and to give it "character," the people have unconsciously changed the *v* to the voiceless *f*; hence *palefroi*, which is not so likely to change. And in these tables we do indeed find that *f* generally remains *f*; in only about 3 cases out of 12 does it degenerate into *b* or *v*, or disappear entirely.

As to the doubling of single labials, we notice that this very rarely occurs when the accented syllable follows immediately; this is what might be expected. In the Romance languages, the single consonant goes with the following vowel, and will not probably be doubled when this vowel is accented. But the case is different when the preceding vowel is tonic. Since the speaker wishes to emphasize this one syllable, he will strengthen it as much as possible, and, in addition to the consonant at its beginning, he will add another to its end; hence the single consonant which follows the accent will be doubled, as it cannot be taken bodily from its own syllable.

Double consonants, as we learn, rarely degenerate into weaker sounds. But out of two examples with an intervocalic double labial, one will eventually have a single consonant, the other retaining the double sound. Here again, the voiceless dento-labial is apt to remain unchanged; *ff* becomes *f* only 7 times out of 16; in the other 9 cases *ff* remains *ff*. *pp* and *bb* become *p* and *b* respectively oftener than they remain unchanged, and this change is particularly noted when the double consonant precedes the accented vowel. The accent seems to draw both consonants over to itself, and the effect of a single consonant is thus produced; this, I pre-

sume, is the first step in the degeneration of double *p* and *b*. The people, hearing apparently but one consonant before the accent, soon lose all consciousness of the double sound and will eventually pronounce but a single *p* or *b*.

If these last two phenomena are really due to the power of the accent, they should occur less frequently in French than in any other Romance language, because here the accent is of comparatively less importance; this we find to be the case, and as at the beginning of this paper I attempted to give a reason for the weak accent in French, I have thus illustrated the three successive steps in the study of each linguistic development: 1) the collecting of facts, 2) the explanation of these products by the laws of physiological phonetics, 3) the investigation of the fundamental reason for the operation of these particular phonetic laws in any given country.

It is, however, only after thousands and thousands of examples have been collected that we can really begin to formulate laws, and in order to give some idea of the immensity of this field, I may state that the tables we have just been considering include some 15,000 Romance words.*

* These tables, with the results obtained from them, will be published within a year.

ON SODIUM SULPHARSENIATE.

By L. W. McCAY.

1. The Molecular Formula.

This sulpho-salt was discovered by Berzelius* who assigned to it the formula $2(\text{Na}_3\text{AsS}_3) + 15\text{H}_2\text{O}$. Berzelius found:

As_2S_5	38.5 %
Na_2S	28.6 "
H_2O	32.9 "

100.0

*Pogg. Ann. 7, p. 14.

It was also examined by Rammelsberg.* Rammelsberg prepared it by boiling a mixture of 1 pt. sulphur, 1.5 pts. arsenite and 8 pts. crystallized sodium carbonate, permitting the resulting liquid to crystallize and purifying the crystals obtained by dissolving and recrystallizing them. He analysed the salt and obtained:

As, S,	37.32 %
Na ₂ S	28.52 "
H ₂ O	34.16 "
	100.00

Rammelsberg says the analysis corresponds to the formula, $2(\text{Na}_3 \text{As S}_4) + 15 \text{H}_2\text{O}$.

Fresenius† prepared the salt by saturating a solution of caustic soda containing 10 pts. of the alkali with sulphuretted hydrogen, adding an equal amount of caustic soda, heating and dissolving in the liquid 26 pts. of arsenic trisulphide and 7 pts. of sulphur. Upon partially evaporating the liquid, filtering it and allowing the filtrate to slowly cool the salt was obtained in the form of pale yellow crystals. Fresenius gives no analysis, but he also represents the composition of the salt by the formula $2(\text{Na}_3 \text{As S}_4) + 15 \text{H}_2\text{O}$.

I have again and again had occasion to prepare large amounts of this salt, and my assistant, Mr. Geo. A. Hulett, has subjected it to a searching examination. The method employed for preparing the salt was this: Sodium arsenite ($\text{Na}_2\text{HAsO}_4 + 12\text{H}_2\text{O}$) was dissolved in a small amount of water, and rendered distinctly alkaline with pure caustic soda. The solution was brought into a bottle, the bottle filled almost to the neck with cold, freshly boiled water, and the liquid treated for six hours with a rapid current of sulphuretted hydrogen gas. The bottle was then tightly

stoppered and heated in the water bath for one hour. When perfectly cool the contents were poured into absolute alcohol. The resulting crystals were thoroughly washed with absolute alcohol and dried on filter paper in the open air. They are almost white, being of a somewhat grayish tinge, and dissolve with the greatest ease in water.

The pentasulphide of arsenic was determined by precipitating it from a solution of the salt in water with hydrochloric acid, collecting it in a Gooch crucible over asbestos, washing it with water and absolute alcohol, and drying it at 110°. The sodium chloride in the filtrate was weighed, and the corresponding amount of sodium sulphide calculated. The water was determined indirectly and directly—indirectly by letting a weighed portion of the salt remain in a vacuum (730 mm. Hg.) over concentrated sulphuric acid for twenty-three days, directly by heating a convenient quantity of the salt to 125° on a semi-cylindrical piece of platinum foil shoved into a glass tube through which a slow current of pure, dry nitrogen gas was passed, and collecting the water in a light calcium chloride tube. The glass tube in which the salt was heated passed through two holes cut in an ordinary copper air bath, each end projecting about 15 cm. on either side of the bath, and the platinum foil was so placed that it occupied the centre of the tube and consequently the centre of the air bath. The thermometer of the bath was shoved down until it was almost in contact with that part of the tube directly above the salt.

Great care was exercised in determining the water, inasmuch as it is only by estimating this constituent exactly that definite conclusions can be reached as to whether the composition of the salt is to be represented by the formula $\text{Na}_3\text{As S}_4 +$

* Pogg. Ann. 52, p. 239.

† Zeits. f. analy. Chemie, 1, p. 192.

8 H₂O or by the formula 2(Na₃AsS₄) + 15 H₂O. The following are the analyses:

I.

Taken for As₂S₅ and Na₂S 0.5110 g. salt.
" " H₂O (indirect) 1.2105 " "

Found:

As ₂ S ₅	37.29 %
Na ₂ S	28.12 "
H ₂ O	34.48 "
<hr/>	
	99.89

II.

Taken for As₂S₅ and Na₂S 0.5027 g. salt.
" " H₂O (direct) 0.6937 " "

Found:

As ₂ S ₅	37.36 %
Na ₂ S	28.13 "
H ₂ O	34.46 "
<hr/>	
	99.95

III.

Taken for As₂S₅ and Na₂S 0.5000 g. salt.
" " H₂O (direct) 0.8437 " "

Found:

As ₂ S ₅	37.20 %
Na ₂ S	28.20 "
H ₂ O	34.75 "
<hr/>	
	100.15

Average.

As ₂ S ₅	37.28 %
Na ₂ S	28.15 "
H ₂ O	34.56 "
<hr/>	
	99.99

Below are the calculated percentages:

Calculated for Na₃AsS₄ + 8 H₂O.

As ₂ S ₅	37.26 %
Na ₂ S	28.12 "
H ₂ O	34.62 "
<hr/>	
	100.00

Calculated for 2(Na₃AsS₄) + 15 H₂O.

As ₂ S ₅	38.08 %
Na ₂ S	28.75 "
H ₂ O	33.17 "
<hr/>	
	100.00

It would appear then that the formula assigned this salt by Berzelius and advocated by Rammelsberg and Fresenius is incorrect. At all events, the salt prepared according to the method above described certainly contains 8 molecules of water.*

II. Does Orthosulpharsenic Acid Exist?

In his classic work upon the sulphides of arsenic and their compounds C. F. Nilsson† states that when a cold, dilute solution of sodium sulpharsenite is decomposed with hydrochloric acid all or nearly all the sulphur which the dry salt contains remains combined with the pentasulphide of arsenic in the precipitate, and that in view of this fact it cannot be doubted that one of the products of the decomposition in question is the sulphhydrate, H₃AsS₄, or *orthosulpharsenic acid*. He further states that the precipitated sulphhydrated pentasulphide loses its sulphuretted hydrogen with great difficulty. He could not remove the sulphuretted hydrogen by drying the precipitate at 80–90° in the air, and it was only by thoroughly boiling the solution in which the precipitation with hydrochloric acid was made, and in which consequently the pentasulphide was suspended, that he succeeded in expelling the sulphuretted hydrogen. However, the pentasulphide thus obtained

* The errors resulting from ascribing to this salt the formula 2(Na₃AsS₄) + 15 H₂O, instead of Na₃AsS₄ + 8 H₂O, amount to practically nothing where only small quantities of substance are concerned. See my article on the separation of sulpharsenic from sulphonylarsenic acid, Zeits. f. analy. Chemie, XXXI, Jahrgang.

† Journal f. prakt. Chemie, N. J., 14, p. 149–154. Also p. 170, No. 19.

was, according to him, hydrated— $\text{As}_2\text{S}_5 + \text{H}_2\text{O}$ —and to remove the water, and at the same time avoid oxidation, he found it necessary to dry the hydrated pentasulphide at 90–95° in an air bath.

I have in vain endeavored to prepare free sulpharsenic acid according to the directions of Nilson. The precipitate obtained upon adding a mineral acid to a dilute solution of sodium sulpharsenite as prepared by me is certainly not sulphhydrated. It contains only traces of sulphuretted hydrogen, and these can be removed with ease. The precipitate is bulky and contains much water, but it all escapes if the sulphide be permitted to stand in a vacuum over concentrated sulphuric acid, or be dried at 100–110° in an air bath.

Experiments.

I.

0.5027 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$ was dissolved in about 100 cm.³ of water and rendered faintly acid with hydrochloric acid. The precipitate was filtered off, washed with water, and a few times with alcohol, and permitted to stand for 18 hrs. in a vacuum over concentrated sulphuric acid. It weighed 0.1879 g. = 37.36 % As_2S_5 . Theory requires 37.26 %. On further drying at 107° for 1½ hrs., in an air bath, the weight of the sulphide remained practically constant—0.1878 instead of 0.1879 g.

II.

0.5139 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$ was dissolved in water and decomposed with hydrochloric acid. The precipitate was washed as before, dried first in a vacuum over concentrated sulphuric acid (24 hrs.) and then in an air bath at 107° (1½ hrs.). The precipitate weighed in the former case 0.1922, and in the latter 0.1920 g. = 37.40 % As_2S_5 . Theory requires 37.26 %. It

will be seen that the weights are here likewise constant.

The two experiments go to prove that the pentasulphide as above precipitated is completely dehydrated by standing in a vacuum over strong sulphuric acid.

Pieces of paper moistened with lead acetate and suspended above the precipitates remained intact.

III.

0.5105 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$ was dissolved in water and decomposed with hydrochloric acid. The precipitate, washed as before, was dried at 87° for 1½ hrs., in an air bath. Found 0.1904 g. = 37.30 % As_2S_5 . Theory requires 37.26 %.

IV.

0.5004 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$, treated similarly to III, gave 0.1864 g. = 37.25 % As_2S_5 . Theory demands 37.27 %.

Experiments III and IV show that the pentasulphide is dehydrated below 100°.

V.

0.4563 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$ was dissolved in water, decomposed with hydrochloric acid, and the sulphuretted hydrogen evolved forced, by means of a current of pure hydrogen gas, into an alkaline solution of lead nitrate. The lead sulphide was filtered off, oxidized, and the sulphuric acid precipitated with barium chloride. Found 0.3748 g. BaS_4 = 0.0547 g. H_2S = 11.98 % H_2S . Theory requires 12.27 %.

The filtrate from the As_2S_5 gave no reaction for sulphuretted hydrogen.

VI.

0.5264 g. $\text{Na}_3\text{AsS}_4 + 8\text{H}_2\text{O}$ was dissolved in water, decomposed with hydrochloric acid, and the sulphuretted hydrogen evolved absorbed as above indicated. Found 0.4334 g. BaS_4 = 0.9633 g. H_2S = 12.02 % H_2S . Theory requires 12.27 %.

The As_2S_5 was filtered off and heated

to 110° in a current of nitrogen, the escaping gas being passed into an alkaline solution of lead nitrate. The solution, however, remained practically colorless, a faint brownish tint alone making its appearance.

The above experiments go to prove that when a solution of sodium sulpharsenite is treated with hydrochloric acid, the decomposition takes place, not in accordance with the equation, $2 \text{Na}_3\text{AsS}_4 + 6 \text{HCl} = 6 \text{NaCl} + 2 \text{H}_3\text{AsS}_4$, as advocated by Nilson, but exactly as represented by the equation, $2 \text{Na}_3\text{AsS}_4 + 6 \text{HCl} = 6 \text{NaCl} + \text{As}_2\text{S}_5 + 3 \text{H}_2\text{S}$. In a word, there is no evidence of the existence of free orthosulpharsenic acid.

A careful study of the articles of Berzelius and Nilson on the sulphur compounds of arsenic has convinced me that most of the irregularities observed by them in their experimental investigations were brought about by the presence of sulphoxy-compounds in their solutions. I have already pointed out the rôle played by orthomonosulphtrioxyarsenic acid in connection with the action of sulphuretted hydrogen on solutions of arseniates acidified with hydrochloric and sulphuric acids, and I hope soon to be prepared to speak in detail concerning the formation of sulphoxy-salts when arsenic pentasulphide is dissolved in the caustic alkalies.*

In closing, I would like to express my sincere thanks to my assistant, Mr. Geo. A. Hulett, for his kindness in attending to the analytical portion of this investigation.

[Abstract of an article written for *Fresenius Zeits. f. analyt. Chemie.*]

* *Chemiker Zeitung*, 1891, X V, 476.

AN APPARATUS FOR SHOWING THE COMPOSITION OF WATER BY VOLUME.

By GEORGE A. HULETT.

Two forms of this apparatus are described in Hofmann's "Einleitung in die Moderne Chemie." One consists of a U-shaped tube, a limb of which is closed above and provided with a steam jacket. The U tube is filled with mercury, the detonating gas introduced and its volume measured. After the gas has been rarefied and exploded, the resulting volume of water vapor is shown by adjusting the levels of mercury in the U tube.

This form of the apparatus is difficult to manipulate while only small volumes can be shown.

In the last edition of the Einleitung, Hofmann makes use of a long straight glass tube, closed at one end, and provided with spark wires. This eudiometer is filled and inverted in a large tank of mercury. It is then surrounded with a steam jacket, and both eudiometer and jacket are fastened to an upright support by movable clamps.

The desired volume of detonating gas is introduced from below, and, since the eudiometer is only partially filled, the gas is under less than atmospheric pressure, and may be exploded without danger. After combination has taken place, the apparatus is lowered in the mercury trough until the original pressure is restored, and it is seen that two volumes of water vapor are formed by the union of two volumes of hydrogen with one volume of oxygen.

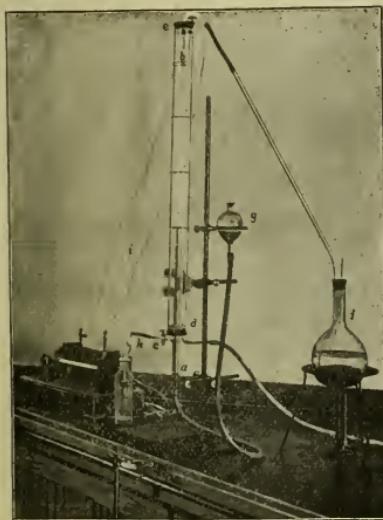
This apparatus requires a large amount of mercury, moreover the air which elings to the tube when it is filled with mercury is difficult to dislodge and if the mercury is not perfectly dry, not only this air but also water vapor, is sure to collect in the

eudiometer when steam is passed through the jacket.

It seems possible to avoid some of these difficulties by a simple modification of the above apparatus. If the lower end of the eudiometer tube be connected with a little reservoir, only a small amount of mercury need be used; further, it will be seen at once that this adjustable reservoir makes it a very simple matter to collect the desired volume of detonating gas, or to measure the resulting volume of water vapor, and, by lowering the reservoir, to so rarefy the gas that the explosion takes place quietly and without danger to the apparatus.

DESCRIPTION OF THE APPARATUS.

Accompanying is a cut of the appara-



tus. *a b* is a glass tube, 85 cm. long and 15 mm. diameter, closed above and provided with the usual spark wires. From the closed end three equal volumes are measured off, each about 15 cm. long. 10

cm. from the lower open end is a side tube, *c*, 9 cm. long, 1 mm. internal and 7 mm. external diameter, which is provided with a stopcock, and serves for introducing the gases.

A steam jacket, a glass tube 80 cm. long, 4 cm. wide, surrounds the eudiometer and is fastened to it just above the side tube. A cork closes the upper end of the jacket, and through it pass the spark machine wires and a glass tube for connection with the steam boiler *f*, a large glass or copper flask.

The mercury reservoir *g* is a glass bulb of 300 cc. capacity and is joined to the lower end of the eudiometer by a strong rubber tube one meter long. The connection is made by forcing the rubber tube over the end of the eudiometer, or they may be joined by a small glass tube (8 mm. diameter) and a tightly fitting rubber cork. The eudiometer with jacket is clamped in an upright position. The mercury reservoir rests in an adjustable ring support.

The apparatus for generating the detonating gas is a common wash bottle 4x12 cm., through the sides of which the wires, bearing the platinum electrodes, are fused. A few cc. of mercury are placed in the bottom of the generator and covered with acidulated water. The glass stopper is provided with a delivery tube, *h*, and a manometer *i*, 60 cm. long extending to the bottom of the generator where it dips underneath the mercury.

MANIPULATION.

The eudiometer, the rubber tube and reservoir are thoroughly dried, and then filled with mercury, which has been heated for several hours so as to remove every trace of moisture, (care being taken to fill the little side tube.) The eudiometer is now clamped in an upright position, and, by lowering and elevating the reservoir,

the mercury column is caused to oscillate in the eudiometer. A vacuum is also produced and the air which clings to the glass tube is easily collected and can be removed by inverting the eudiometer. The apparatus is then adjusted to its support and no air or water vapor should collect in the eudiometer when steam is passed through the jacket.

Three Grove cells are sufficient to generate the detonating gas. When all air has been displaced by the gas, the delivery tube *h* is joined to the side tube *c* of the eudiometer by a short piece of rubber tubing. The glass tubes should touch so that as little rubber as possible is exposed to the action of the ozone, which is formed in generating detonating gas. On making the connection, the mercury in the manometer commences to rise, as there is no outlet for the gas. When a pressure of 400 mm. of mercury is indicated, the stopcock on the side tube is opened, and the gas is forced in regularly and quietly. By adjusting the reservoir the desired volume can be collected. After closing the stopcock and disconnecting the generator, the reservoir is lowered and the gas rarefied until it occupies all that portion of the eudiometer enclosed by the jacket. If we

now explode the gas by an electric spark, only a harmless flash is observed to traverse the tube, and on elevating the reservoir to restore the original pressure, the resulting volume of water vapor is seen to occupy just $\frac{2}{3}$ the space occupied by the detonating gas.

A little ozone is formed in generating detonating gas, and about 2 per cent. of water vapor is mixed with the gas. On exploding such a mixture, the resulting volume of water vapor should be a trifle more than $\frac{2}{3}$ of the volume of the mixture. However, the mercury column is an excellent conductor of heat, and must condense slightly the water vapor in contact with it; at all events, the errors happen to balance, and the results are all that could be desired.

All the errors can be avoided by keeping the generator at 100° C. by means of a steam jacket, so as to avoid the formation of ozone. Then the gas must be dried before introducing, and amyl alcohol used in the jacket to keep the temperature of the mercury column above 100° C.; but for the lecture room these precautions are unnecessary.

CHEMICAL LABORATORY, May, 1894.

SUMMARIES OF PAPERS READ.

DONATELLO.

By ALLAN MARQUAND.

Donatello's art is essentially dramatic and pictorial. These qualities, which may be detected in his early works, are more emphatically expressed in his later sculpture. The modern study of Donatello, represented chiefly by the Germans, exalts him to an eminence greater than he deserves and relegates his contemporary Ghiberti to the school of Gothic sculptors.

This we account for partly by the undue emphasis placed upon Donatello by reason of the celebration of his 500th birthday in 1886, and partly by the German fondness for realistic sculpture. Ghiberti, by his love for beautiful lines and his fine sense of form, represented qualities of Renaissance sculpture quite as marked and characteristic as the realistic tendency.

The chronological series of Donatello's

works having been in the main well established we find his style changing from Gothic realism to classic beauty and finally degenerating to dramatic emotionalism. He thus becomes a prophetic epitome of the history of Renaissance sculpture. His early period, extending till 1425, saw completed a series of statues for the Cathedral of Florence, for its Campanile and for the church of Or San Michele. Of these the Zuccone is a typical and the S. George the finest example. His unskilfulness in the use of bronze and his habit of working in marble sufficiently account for the style of these statues, rendering unnecessary the supposition that they may be regarded as studies in perspective effect.

During the second period of his career, from 1425 to 1444, his sphere of work extends to Prato, Siena, Montepulciano, Orvieto, Rome and Naples. He works in association with Michelozzo and uses bronze more frequently. In this period his choir-gallery for the Cathedral of Florence, his bronze David and his Judith and Holofernes are his finest works. They show an original fancy, a freedom from Gothic tradition and an advance in formal beauty. The multiplication of his orders and his unsuccessful attempts at bronze casting makes him rely more upon his assistants. He confines himself largely to making designs or sketches for others to execute. This leads him in his final period, from 1444 until his death, to develop the ideal rather than the plastic side of his work. In the reliefs at S. Antonio in Padua and in the pulpits at San Lorenzo in Florence we find that he has sacrificed beauty of form for the sake of emotional effect, and thus becomes a precursor of the Rococo style of sculpture, whereas in his middle period he repre-

sents much of what is best in Italian sculpture of the XVth century.

[Abstract of a lecture delivered in the Metropolitan Museum of Art, New York, March 24, 1894.]

THE EVOLUTION OF LIBERAL EDUCATION.

By ANDREW F. WEST.

I.

An answer to the question, What properly constitutes a liberal education? may, like solutions to other educational problems, be attempted in three ways, the practical, the theoretical and the historical. The first attempts the answer by examining present educational practice, including both the existing institutions and the operative ideas therein embodied. Even if the enormous labor properly involved in collecting and classifying what is necessary to a true description of our educational practice were performed, the answer obtainable would be an unsatisfactory one. A view of the state of education at any one instant of history is too limited to serve as the basis of a theory which, to be true, must comprehend all the salient facts of history; and too limited also for us to be sure that it is representative of the whole of history. Accordingly this method may be set aside, not as being useless, but as unpromising when taken alone.

The second way of attempting an answer is the theoretical. Theorizing is always pleasant, usually dangerous, but at intervals safe and necessary. It cannot be ignored. If we are not seeking a sound theory of education, we are not acting rationally, and our educational activity will suffer accordingly. Even if we should go so far as to concede that a com-

prehensive theory of liberal education is at present unattainable, we might still hold with Kant that "we are not to consider the idea chimerical and denounce it as an idle dream, even when obstacles appear in the way of its realization."*

We do not yield to the notion that because there is as yet no doctrine of education which amounts to a science, the study of education does not promise well, and urge that the study of education is becoming a science and that education itself is already a great art, and therefore, from both points of view, a fit subject for high ideal study. We may, however, freely admit that the most convincing single method at the present time is not the theoretical. For a theoretical solution, if it is to be a true one in education, must receive its data from the other sciences on which a science of education will depend; namely, physiology, psychology and ethics; and these sciences, though constant contributors of late, have yielded a contribution insufficient for theoretical construction on any general scale. Nor may we expect that they will begin to satisfy us until their own inductions are reduced to greater exactness and likewise made more extensive. It is still early in the world's history to expect this.

The remaining method is the historical, and, for the problem of liberal education, the most promising. The idea of liberal education emerged early in the history of Western culture, and we have a fairly continuous record of its outworking from its first manifestation to the present time. It is reasonable to suppose that an idea which has been unfolding for nearly twenty-five centuries, and has been potent in preserving and diffusing enlightenment and stimulating the love of truth through

all that time, should afford us some light from its record both as to the ideal toward which its outworking tends and as to what are its constituent elements.

II.

The concept of liberal education originated among the Greeks, and gives continuity to the history of liberal education since their time. They were the first to coördinate what they called *ἐγκύκλιος παιδεία*, an "all-round education." By this they meant a training in selected studies of the most central character, so as to secure harmonious wholeness or integrity of intellectual culture. They sought a general gymnastic of the mind for the sake of the mind, and not for any extraneous utility. This view of the material and method of liberal education, however, was not the whole of their concept. If it were, then there might be several, perhaps many kinds of general culture. But with that instinct for ideal unity and perfection which appears in everything they touched, they determined what ingredients should enter into their method and material of instruction by determining the ideal end of liberal education. This was what we inexactly name Virtue (*ἀρετή*), or, as they meant it, the highest manhood; or *ἀρετὴ κατὰ γένος*, the highest excellence of the individual according to his kind—that is, as a man. If it could be ascertained in what this highest excellence consisted, then the method and material of instruction which would develop it would be the method and material of liberal education. Now, to their best thinkers the attainment of *ἀρετή* was inseparable from knowledge. "All men naturally desire knowledge" is Aristotle's opening sentence in his "Metaphysics" and a commonplace of philosophy ever since. The desire for knowledge is constitutional, and on this

* "Ueber Pädagogik."

the possibility of educating depends. But to be liberalizing, knowledge must lead to virtue. The ideal knowledge, then, was that fine blending of theory and practice which served the individual both toward the understanding and the doing of the truth. It was *σοφία*, Wisdom, the guide of thought and the guide of life. And so we can hardly wonder at their frequent identification of knowledge and virtue, and wisdom and virtue. The divorce of theoretical and practical, either inside any sphere of knowledge or conduct, or between knowledge and conduct as wholes, would have seemed to them utterly irrational.

This discipline of youth in knowledge until they attained the character of enlightened and virtuous men, sure to go on spontaneously in the discovery and use of truth, being by that time imbued with *φιλοσοφία*—the love of it—was the Greek idea of the school training of youth which would lead to the best manhood. Their whole concept is indicated in the Pythagorean saying, *Πρὸ φιλοσοφίας παιδεία*—first education, then philosophy. First discipline in the central categories of the best knowledge, then free research into all knowledge. First the school, then the university.

Out of these presuppositions there naturally grew up the idea of a logical sequence and coördination of studies to achieve this end—that is, of a curriculum. That there should be one finest way of doing this, to which other ways were at best approximations, needed to them no demonstration. “Truth is one and only one, and error is manifold,” is their reasoning from Pythagoras onward. The only question, then, remaining to settle was what studies properly fill out the form of this ideal curriculum. The Greeks discovered and determined the ideal form of liberal cul-

ture, and, if history means anything, they have determined the form once for all. The race has been progressively determining the content ever since.

The first body of studies which thus gradually arranged itself passed over to Rome, and then crystallized with some shrinkage in the early middle ages into the famous “seven liberal arts,” wherein all medieval education centered. Whatever condemnation is to be passed upon the barren technical subtleties of the medieval mind, let us not charge these defects to the seven arts, but to the natural behavior of minds exercising themselves almost solely on the forms of knowledge—a logical thing, by the way, in the evolution of the modern world. Nor should their defects be charged to Christianity; scarcely to ecclesiasticism. The semi-barbarous European mind was beginning to be schooled *de novo*. The seven arts, while devoid of the living expression of ancient liberal culture, presented at least a recognizable outline of the features, and thus preserved some continuity. What were these arts? Grammar, rhetoric, and logic were the first three to be pursued. By grammar their best teachers, though not the most of them, meant both strict grammar (Latin, of course) and the study of literature. It was the inevitable first study, the *nutrix infantis*, the induction into the art of correct expression. Then came rhetoric, springing out of grammar, leading to the study of style and also analysis of themes, and thus bridging the way to logic, the art of correct thinking. Such was in concept the trivium, a coherent arrangement corresponding to the order of a scholar’s mental development and the sequence of ideas in the studies themselves. It combined the *artes sermocinales*, the arts concerned with expression. Following the trivium came the four arts,

usually called "disciplines" or "sciences," sometimes "mathematics." They made the quadrivium. The opening study was arithmetic, defined by Rabanus Maurus, the great preceptor of Fulda, as "the study of numerical quantity," and the generic "mathematical discipline." It bore the same introductory relation to the quadrivium which grammar bore to the trivium. The others were music, geometry, and astronomy—names which mean to us somewhat different things. For their scheme of sciences on the nature side was of course hopelessly crude. Their arithmetic oddly but not unnaturally included chronology; optics came under geometry and acoustics under music—things afterward differentiated from what they had been awkwardly attached to at first. But though the scheme was in an embryonic stage, structural lines were appearing, and, most important of all, two distinctions were spontaneously recognized. The first was the distinction between the trivium, or the humanities, and the quadrivium, or the nature studies, the *artes reales*. The second was the order in which these were to be pursued as liberal studies, the humanistic studies coming before the sciences. The seven arts completed, then came "philosophy," to combine and coördinate trivium and quadrivium in a higher union, thus constituting the great triad that lasts still.

The age of scholasticism was the best of the middle ages. It founded our universities. "The priceless pearl of knowledge is sought in the scholastic field," is the characteristic opening of many a medieval university document. That ideal knowledge rested on the seven arts and was philosophy, and its language was Latin.

Was not this outline, though meagerly bodied and crudely colored, a noble one? At worst, was it not the imperfect skeleton of the ancient living form, but still the

reminder of its true structure? New life had to be breathed into these bones that they might live again, and in the Revival of Learning this happened.

The spirit of the Greeks revived, and humanism arose to clothe the lifeless skeleton with living tissues. But only in part. In its reaction against the barbarous Latin and barren formalism of scholasticism it plunged into Greek antiquity and filled literary studies with new life. It really developed the trivium. Its legacy is the humanistic studies, and its language is Greek. No new movement comparable to the humanistic revival appears in the modern world until we approach the nineteenth century, the age of science. Modern sciences—physical, natural, social, political—are the educational material developed in our age. Science has developed the quadrivium, formerly inchoate and feeble. Its gift to education is itself, and it speaks in the modern tongues.

Here we may sum up our results. Western liberal education has gone through stages as marked as the stages of life in an individual or the history of types in biology. The ancient world spontaneously evolves a concept of liberal education which it hands down to medieval times. The form lingered, though the spirit, if not dead, was sleeping. The ancient form consisted of the humanities and sciences coördinated in one scheme and issuing in philosophy. Scholasticism awakened the philosophic sense, using Latin. The modern age first developed humanistic studies through the medium of Greek, and then developed science with its polyglot corollary, of which the chief constituents are French, German and English.

We have, therefore, come to a time in the history of education when a scheme of studies must be followed either by syn-

thesis from the lessons of history or by selection from that synthesis. Synthesis alone will give the completest culture, if evolution means anything. It is not a final or perfect synthesis we seek, but a view of the best thus far. The only question to be settled is a practical one, it seems to me. Have we time to do this? If not, we must make a selection out of our historical elements, and get along with a recognizably imperfect scheme. But I believe we have time. Much of school time is wasted now for those who would prepare for university studies. We can save enough to admit of a liberal culture, including all the great historical elements. Reducing these to a tentative ideal scheme, we get the following curriculum for a liberal education:

I. The humanities—consisting of the mother tongue and foreign languages and literatures. The foreign tongues include Greek and Latin, fundamental to Western culture as a whole, and the continental languages as useful to present culture.

II. The sciences—mathematical, natural, sociological.

III. The elements of philosophy.

Such an education should be attempted whole, and kept separate, one, distinguishable by its own degree. It will vindicate itself.

I have not touched and do not mean here to enter upon the boundless theme of the influence of Christianity in liberal education. But is it too much to expect that, under the university charter-words of our faith: "Whatsoever things are true, honest, just, lovely—think on these things," we may see a new epoch, finer even than that time when, as Shelley beautifully tells us, Freedom spoke—

" And like a sunrise from the sea
Athens arose."

[Read at the Congress on Higher Education, in Chicago, July, 1893.]

AN EXAMINATION OF THE NON-DRAMATIC POEMS IN ROBERT BROWNING'S FIRST AND SECOND PERIODS.

By THOMAS M. PARROTT.

This study does not pretend to be an exhaustive treatment of Browning. It is simply an attempt to discover such poems of his as are marked by the absence of his prevalent dramatic method, and to extract from them by careful examination his beliefs on the great questions of life. Since as a rule Browning prefers to teach indirectly and by object lessons (*Ring and the Book*, v. XII ll. 836 sq.), the theory of life (*Weltanschauung*) embodied in these poems might at first be considered an incomplete presentation of his beliefs, but careful study of his dramatic poems goes to show that these contain no essential points that may not also be found in the poems under consideration. Moreover, the method pursued in this study has the great advantage of using the direct personal statements of the poet, thus avoiding the prevalent method of miscellaneous quotation.

Browning's position in English literature is unique. He is without literary parents or progeny, and this very fact necessitates a carefuller study of his work, since it is only through himself that he can be understood. At the same time the commonplace that he was out of sympathy with his age is only a half truth. A series of tables (pp. 13-19) contains the allusions in his poems to the men and women of his time, statesmen, authors, philosophers and artists, as well as to political events, social movements, etc., etc.

Two difficulties lie in the way of an attempt to present concretely and systematically Browning's theory of life:

first, the fact, too often forgotten, that he was a poet rather than a philosopher; second, the dramatic method which colors so much of his work. With the exception of *Ferishtah's Fancies* and *Parleyings*, Browning has written nothing that may be considered as a systematic and more or less complete Confession of Faith. His theory of life is to be constructed from hints, allusions and single utterances scattered through his work, and its occasional contradictions are due either to his development beyond a standpoint once adopted, or to the influences of temporary moods. Browning's dramatic method extends beyond the bounds of his dramas proper, though the great body of his work which M. Sarrazin (*Renaissance de la Poesie Anglaise*) styles "la psychologie dramatique." His "drama of the soul" presents us with objective character, by no means his own, as is often falsely assumed, in a process of self-revelation. This process is effected, as in the regular drama, by the interaction of the various *personæ*, but with Browning the action is internal, that of mind on mind. "Il substitue les causes effets, et au théâtre extérieur, c'est à dire à l'aboutissement de l'âme le théâtre intérieur, c'est à dire l'âme elle-même." (Sarrazin.) Thus with him thought has the same function as physical action in the drama proper; it reveals the character which lies behind the thought as behind the act. An examination of *Andrea del Sarto* (pp. 28-29) illustrates the workings of this method, which has received from critics the name of the "Dramatic Monologue," but which is also found more or less in the poems styled by Browning Dramatic Lyrics and Romances. A series of quotations (pp. 32-33) shows the impropriety of identifying the speakers in such poems with the poet himself.

There are, however, a number of poems which give direct utterance to Browning's personal beliefs. These may be divided into two classes: I. Poems (or passages) in which the dramatic form is altogether lacking; II. Poems (or passages) which, though dramatic in form, are personal in content. Under this latter class are included only such poems as evidence, external or internal, proves to be utterances of the poet, or such as an inherent dramatic impropriety shows to be subjective rather than objective work. Examples: *Rabbi Ben Ezra*, *The Pope*, (*in Ring and the Book*); *At the Mermaid*, etc.

Adopting Mr. Fotheringham's classification (*Studies in the Poetry of Robert Browning*) of the periods of Browning's work, an investigation of all the poems of each period was made with a view to finding what might be included under the two classes of personal (non-dramatic) poems. The result is given in the tables on pp. 47-50.

The remainder of the study embraces an investigation of all such poems in the first two periods of the poet's production, from *Pauline* (1833) to *Luria* (1845). The tedium of this method is perhaps balanced by the degree of scientific accuracy which it attains.

To the study is added a bibliography. This falls into two parts: 1st, a catalogue of all Browning's productions based upon Dr. Furnival's, but more complete; 2d, a catalogue of biographical, critical and miscellaneous works dealing with the poet, based upon the material of the British Museum. Magazine articles are not noticed. An excellent list of these is given by J. P. Anderson, of the British Museum, in the appendix to Sharp's *Life of Browning*.

[Abstract of a Thesis presented to the Philosophical Society of Leipzig for the degree of Doctor of Philosophy.]



A TERRACOTTA SKETCH BY LORENZO GHIBERTI.

By ALLAN MARQUAND.

SUMMARIES OF PAPERS PUBLISHED.

A TERRACOTTA SKETCH BY LORENZO GHIBERTI.

By ALLAN MARQUAND.

In the autumn of 1892, I purchased of the Fratelli Bassetti in Siena a terracotta sketch, supposed to be by Ghiberti. It was said to have been long in the possession of a Siennese family. Further than this I know nothing of its provenance. The sketch has every apparent indication of being an old one. Traces of coloring, now largely washed away, still remain. At some period of its history the sketch had fallen from its place and broken in several places, but its original fragments were carefully gathered and mounted on a slate ground, which seems to have been cemented on to a wall, so as to prevent further injury. The subject of the composition is a portion of the group to the left in the Moses panel of the second of Ghiberti's bronze gates for the Baptistry of Florence. In his Second Commentary,* Ghiberti gives this brief notice of the composition:—"In the seventh panel is (represented) how Moses received the tablets (of the law) on the mountain, and how half-way up the mountain Joshua waits for him, and how the people are astonished at the earthquakes, lightnings and thunder. And how the people stand at the foot of the mountain in amazement."

The incidents pictured in this panel are taken from the book of Exodus, which will furnish us a few additional details for its interpretation. To the extreme left is the Red Sea and the camp which the children of Israel erected before Mount Sinai. The people at the foot of

the mountain may be divided into two groups; to the left is a quiet group gathered about an old man who is addressing them: to the right a group in consternation over the physical disturbances which accompanied the giving of the law. For the sake of definiteness, we may name the old man Jethro, the father-in-law of Moses, who had recently arrived, bringing with him Moses' wife Zipporah and her two sons, Gershom and Eliezer (Ex. 18. 1-6). He is looking toward the Red Sea and seems to be saying, "Blessed be the Lord, who hath delivered you out of the hand of the Egyptians, and out of the hand of Pharaoh, who hath delivered the people from under the hand of the Egyptians" (Ex. 18. 10). Before him is a row of women in light and graceful pose, suggestive of the women who followed Miriam with timbrels and dances. Miriam herself is represented with a timbrel in her hand in a niche of the framework directly alongside of this group. In the foreground of the quiet group is a young warrior, symbolic of the victories already achieved against the Egyptians and against Amalek. Alongside of the warrior is Zipporah, with her two children.

In the excited group to the right is a woman with a frightened child. She is perhaps the Ethiopian woman, whom Moses had made his wife, much to the dissatisfaction of his sister Miriam and his brother Aaron (Numbers, 12. 1). About her are the elders and people, terrified by the "thunder and lightnings," and the "voice of the trumpet exceeding loud" (Ex. 19. 16). Above is figured Jehovah in the midst of angels, handing the two tables of the law to Moses, who receives them on the top of the mount. Below him, prostrate on the ground, is Joshua, who

*CARL FREY, *Vita di Lorenzo Ghiberti Scultore Fiorentino scritta da Giorgio Vasari*. Berlin, 1886, p. 53.

accompanied him (Ex. 24. 13). Aaron is perhaps to be recognized in the centre of the excited group, and is again represented, with the sacrificial flame in his hand, in a niche of the frame to the right of this panel.

In comparing the terracotta with the bronze, I have been led to believe the former to be a preliminary sketch by Ghiberti, for the following reasons:

1. It is not an exact copy of the group in the bronze panel, and its agreements and differences may be best explained on the supposition that it is a preliminary sketch. The principal figures, which we have named Jethro, the warrior, and Zipporah, appear to have been considered by Ghiberti as successful enough to be reproduced with but slight variations in the bronze. These variations, however, are important. The final sketch for the entire panel, made in wax, contained a more elaborate composition; consequently the three individuals we have named are drawn more closely together and thus separated from the line of women to the left. Jethro, in the bronze, is placed more nearly behind the warrior; the warrior and Zipporah are also drawn closer together. We may observe another important difference, which may be best explained on the same hypothesis. In the final model Ghiberti apparently determined to separate more completely the quiet group on the left from the agitated group on the right. Consequently one of Zipporah's children is removed and finds his place by the side of the figure we have called the Ethiopian woman. As a consequence of this separation, the eye is led through an unobstructed passage between the groups and more readily seizes the principal theme upon the summit of the mountain. The artist, however, will not take away from Zipporah her two sons,

and so replaces the lost child by another, who serves better the purpose of economy of space.

There are several other figures of which more than a reminiscence is preserved in the bronze. The first figure to the left on the terracotta is reproduced in similar attitude, but with more grace. The old woman next to her is retained also, and is adapted by a change of attitude to the enlarged composition. The man with a turban is not forgotten. There was no room for his face, but his turban remains, and in the same relative position. The woman to the right of Zipporah, with hands folded in prayer, is also preserved, but thrown more into the background. There are two other heads, that of a middle-aged man and of a youth, who appear also in the bronze; but in general the artist seems to have developed the idea of presenting a larger mass of people, and this has led him to suppress the representation of several heads and to substitute in their stead an approaching throng, which could be indicated with greater ease and with improved perspective by summarily indicating only the crowns of their heads. In the terracotta sketch, between the warrior and Zipporah is a woman; in the finished bronze a male figure is substituted, which has the advantage of bringing out the figure of Zipporah in stronger contrast.

These considerations seem to show that the variations in composition between the terracotta and the bronze are not such changes as would be likely to occur at the hands of a copyist, but are purposeful modifications by means of which the composition of the terracotta sketch becomes adapted to its new surroundings in the complex composition of the bronze panel.

2. If we compare the style of the terracotta relief with that of the bronze, the

preliminary character of the former will be still more evident.

The terracotta sketch is composed in a thoroughly plastic manner. The figures in the background were first fashioned and those in the foreground applied later. This is evident from the fact that several of the heads in the background are modelled with great care, as could only have been done when the artist was free to work without the impediment of the figures in the foreground. The face and the breast of the warrior show that this figure also was modelled before being put in place. Now this method of plastic composition is not such as is likely to have occurred in the case of a copy from the bronze. Not only would a copyist have been likely to have produced Ghiberti's figures more exactly; he also would have copied Ghiberti's perspective and thus saved himself considerable unnecessary labor.

The terracotta group seems to have been modelled with special reference to the characterization of the different figures. There is here a greater variety of individual characters than in the bronze itself. This individualization is purposely sacrificed in the bronze for the sake of the mass, and the entire composition modified by reason of the enlarged perspective.

If we consider the mode of composition employed in the bronze gates, we find as many as thirty-one distinct events portrayed. In only one panel, that which represents the meeting of Solomon and the Queen of Sheba, do we find pictured a single event; in the rest there are two, three, four, and in the Jacob and Esau panel, as many as six different actions. The style of composition makes it, therefore, not unlikely that Ghiberti made studies for the minor compositions first, and then combined them in the larger units. This must, at least, be admitted in

the case of the Abraham panel, which includes his earlier composition of the sacrifice of Isaac; and if in this case, why not in the rest?

3. Having shown the preliminary character of the sketch, it follows almost immediately that it must be by the hand of Ghiberti himself. In the case of the first Baptistery gates, in which the co-operation of other artists was relied upon to a greater extent, the contract specifically demanded that Ghiberti with his own hand should execute the figures, trees, and such details as the hair, the nudes, etc.* The second gates seem to have been even more exclusively the work of Ghiberti himself.† He was assisted by his son Vettorio and by Michelozzo; but the mannerism of Vettorio, as seen in the frame-work of Andrea Pisano's gates, and the style of Michelozzo, as seen in his work in association with Donatello, are not to be detected in our terracotta. This is evidently the work of a masterhand, as may be judged from the individuality and graceful beauty of the heads and the naturalistic treatment of the drapery. Here and there, I am free to admit, there is a laxity in the pose of certain figures, in the perspective, in the swing of the drapery, that falls short of Ghiberti's best work; but the variation does not seem to be sufficiently strong to compel a different attribution. It is more easily explained by the supposition that the terracotta is a preliminary sketch. Let me call attention to a slight difference between the warrior of the terracotta and the same figure in the bronze. In the terracotta his cloak has a broad fringe and the back of his corslet is differently ornamented. But the variations are strictly within the limits of Ghiberti's own work. The prototype of this figure may be seen

* MÜNTZ, *Les Archives des Arts*, pp. 15, 16.

† MÜNTZ, *Les Archives des Arts*, pp. 19-21.

on Ghiberti's first gates in the panel of Pilate Washing his Hands. Herc and in many other figures on the first gates, and in the panels of the font in the Baptistry at Siena as well, Ghiberti shows a fondness for ornamenting the edges of his draperies. The peculiar type of ornament upon the warrior's back may also be found in the base of Pilate's throne, and again upon the borders of the second gates.

It may be objected that the models for the second gates were in wax, and not in terracotta. A reference to the contract will certainly show that wax models were used for the figures, heads, animals and ornamentation of the borders and cornices; and it may be admitted that the panel reliefs were probably cast in accordance with the same methods. But this in no way prevents our supposing that preliminary sketches may have been made in clay, since Ghiberti himself tells us in his Second Commentary that he made many sketches in this material.* The terracotta sketch is somewhat larger than the original;† this permitted greater freedom in modelling.

The discovery of this sketch has an important bearing on the estimate to be made of Ghiberti's methods. It would seem to indicate that his preliminary sketches were not made upon paper, but in plastic fashion in clay. In this manner he reached a thoroughly sculptural perspective, to be distinguished from that of the painter, and which should be a perpetual object-lesson to those who would force all relief sculpture into flat planes.

[Published in the *American Journal of Archaeology*, April-June, 1894.]

* CARL FREY, *op. cit.*, *Ancora a molti pietori e scultori et statuari o (ho) fatto grandissimi honori ne loro lavorii fatto moltissimi provedimenti di cera e di creta e a pitto e disegno moltissime cose; etiando chi auesse auente appare (a fare) figure grandi fuori dela naturale forma (ho io) dato le regole a condurre con perfetta misura.*

† The figure of the warrior in the terracotta is nine and a quarter inches high; in the bronze it is only four and a half inches.

THE MAMMALIAN FAUNA OF THE DEEP RIVER BEDS.

By W. B. SCOTT.

(1) The beds of the Deep River valley belong to two horizons, as originally pointed out by Grinnell and Dana. These horizons differ widely in lithological character and even more markedly in their contained fossils, and are almost certainly separated by an unconformity of erosion, which represents a considerable lapse of time. The lower series should be placed at the summit of the John Day and the upper at the base of the Loup Fork, where they form a well-marked subdivision (the Ticholeptus beds of Cope). This subdivision is not certainly known in other regions than the present one, and the deposits in Oregon, Nebraska and Wyoming which have been referred to it most probably belong to the Loup Fork proper.

(2) The nearest European equivalent of the upper Deep River beds appears to be the upper Miocene of Sansan and Simorre.

(3) In the genus *Cynodesmus*, which has the dentition of *Canis* combined with the skull and brain of the more ancient genera of the phylum, we find an important link in the genealogy of the dogs, leading back to the White River form, *Daphaenops*, through some as yet unknown genus of the lower John Day, which, however, must have not been unlike the so-called *Temnocyon josephi*. The abundance of Miocene dogs in North America, contrasted with their absence or unimportance in Europe, renders it very probable that the family originated in the former continent.

(4) The name *Anchitherium* has been improperly applied to American equines from the White River and John Day, and should be replaced by *Mesohippus* and *Miohippus*, the latter genus extending through the John Day and into the Loup Fork.

(5) *Desmatippus* is a new genus of

equines which nearly fills the gap between *Miohippus* and *Protohippus*, the molar teeth being intermediate in character between the two, brachydont, and yet with a thin deposit of cement in the valleys.

(6) A quite unexpected discovery is that of a species of *Architherium*, of the type of the European *A. aurelianense*. The genus is very probably of American origin, and, as Schlosser and Mme. Pavlow have suggested, was almost certainly not in the direct line of equine descent, but it has paralleled the true horses in many interesting ways, such as the spout-shaped odontoid, etc.

(7) Surveying the series of equine genera, which there is such good reason to believe constitute an actual line of descent, we find a steady advance in differentiation in the main, accompanied by alternating progression and regression in minor details. It is also very probably true that a slight degree of specialization in a direction away from that taken by the main line, is not incompatible with a place in that line, as is exemplified by the peculiar character of the elbow joint in *Mesohippus*, which is greatly diminished in *Miohippus* and dies out in succeeding genera.

(8) Some of the accessory tubercles in both the American and European species of *Architherium* appear to favor the view of "indeterminate variation."

(9) The rhinoceroses of the Old World separated at a very early period from those of the New, and cannot well have any common ancestor nearer than the Aceratheria of the Oligocene; the American series has, however, run parallel to the European in many important details of structure.

(10) *Mesoreodon*, a new genus of oreodonts from the lower beds, agrees with *Eporeodon* of the John Day in most characters of skull and dentition (though with

some resemblances to *Merychys*) while the feet are altogether like those of the latter genus. Very curious features of this genus are the presence of an ossified thyroid cartilage of the larynx, a rudiment of the bony clavicle and a metacromial process of the scapular spine. It is suggested that the large acromion of the artiodactyls, and its absence in even the Eocene perissodactyls, may be correlated with the earlier loss of the clavicle in the latter group.

(11) The skeleton of the oreodont genus, *Merycochaerus*, is now almost completely known, which permits exact comparison with other members of the group.

(12) *Merychys* is probably to be derived from *Oreodon* through *Eporeodon* and *Mesoreodon*; its resemblances to *Merycochaerus* are due to parallelism and not to relationship. Hence it is impossible to unite these two genera, as has been proposed.

(13) *Leptauchenia* is a White River genus, and the difficulty caused by supposing the three genera of this line to be contemporaneous thus disappears.

(14) A second and somewhat smaller species of *Blastomeryx* is described from the upper beds, and considerable portions of the skeleton show that this species was in size and general appearance very similar to the prong-horn antelope, though with many cervine features. The genus is shown to be closely allied to the European *Palaeomeryx* and was doubtless derived from the Old World, nothing being known in the John Day or White River beds from which it could be descended. The peculiarities of the horns and the occipital region are such as to render it doubtful whether this genus can be ancestral to any existing form. At most, it may be so related to *Antilocapra*.

(15) The axis of *Protolabis* has an odontoid process which may be described as in

the incipient stage of the spout-shape and corresponding to that of *Miohippus* among the horses. The evolution of this structure proceeded by exactly similar steps in the horses and camels and is to be correlated with the increasing length of the neck and the increased angle included between the axes of the cranium and of the cervical vertebrae.

[Abstract of a paper published in the Transactions American Philosophical Society, Vol. xvm, pp. 55-184. Pl. I-VI.]

GASES IN KILAUEA.

By WILLIAM LIBBEY, JR.

In 1865 Mr. W. T. Brigham called attention to the existence of certain bluish-green flames which broke from the crust of Halemaumau during a disturbance of its slag-like surface.

In 1887 Mr. Emerson of the Geological Survey of the Islands and several others identified these same flames. They are referred to in Prof. Dana's book upon "The Characteristics of Volcanoes" (p. 119) as being pale in color and of a slightly greenish color rather than bluish. This corresponds with my own observations. In order to test this matter I took with me upon my recent visit to the volcano (Sept. 14th to 25th, 1893) a pocket spectroscope. I did not imagine that I should have such a splendid opportunity, or I should have taken a better instrument; however, the little spectroscope did good service, and the observations may possibly lead to something better later on.

I spent the greater part of three evenings down on the edge of the boiling cauldron in Halemaumau, and the observations I made were repeated many times, so that I have every confidence in them. As to the conditions, I may say that they were exceptionally favorable. The sur-

face of the molten lava was so high during the whole of our visit that it could be reached with an ordinary walking stick. The volcano seemed to be in a very active state, as several overflows occurred, and the ebullition from what appeared to be three centers of weakness or disturbance were very remarkable. The lava was thrown into the air a distance of 40 to 50 feet, and as we could approach these fountains quite closely in two instances, we could form very good estimates of their size and the amount of lava involved in such an outbreak. Their surface for a considerable area near one of these centers (for they seemed very constant in position) would sway up and down, at first gently and then more violently, particularly in the neighborhood of the intersection of the fissures, which were constantly forming in the crust of slag, then there would be two or three small explosions accompanied by a bumping sound, as though gas had escaped from the mouth of an uncorked bottle; after this there would be a great rush of lava into the air, to be repeated several times, when the surface would become quiet once more.

At the edge of this cauldron, 1000 feet in diameter, I placed myself after dark, and for a couple of hours in each instance had opportunities nearly every five minutes to observe the flames which almost invariably accompanied these explosions. At times they would make their appearance along the fissures in the crust, when they would be very short lived; and I failed to get much information from them, aside from the fact that they seemed to be the exact counterpart of the hydrogen flame from a Bunsen burner.

It was the study of the flames which accompanied the larger outbreaks which appeared to promise most return. Get-

ting as near as possible to one of the giant fountains (probably 50 yards distant) I watched for the premonitory symptoms of an outbreak and got all ready for it, and seldom failed to catch indications of the presence of gases.

For a good part of the time there was a continuous spectrum while the spectroscope was directed across the lava. The first thing that impressed me was the sudden appearance and disappearance of broad *bands* of white light, showing conclusively the presence of gas burning under high pressure. The location of these bands became the next problem, and then I longed for a better instrument with a micrometer eyepiece. The first which appeared with constancy was a band in the green, indicating the presence of carbonic oxide in all probability.

Then I found on other occasions bands of lighter intensity in the red and blue, and the red and purple portions of the spectrum, thus apparently marking the presence of the hydro-carbons. There were also occasionally noticed upon a full spectrum a large series of dark lines in the yellow and orange, sometimes completely blotting these colors out of the spectrum altogether. These need more careful study before assigning them definitely to any substance or substances.

It is hoped that the above may serve to indicate a point upon which valuable work can be done, and that some one will take advantage of it and follow the subject up.

[Abstract of a paper published in the *American Journal of Science*, Vol. XLVII, May, 1894.]

BOOK REVIEWS.

CONTES DE BALZAC. Edited with introduction and notes by George McLean Harper, Ph.D., and Louis Eugene Livingood, A.B. William R. Jenkins, New York.

The success of the long series of admirable translations of Balzac's works by Miss Wormeley shows that the fascinating interest excited by this master of fiction is felt also by readers in this country; but those may be deemed especially fortunate who have the leisure and ability to read him in the original. For advanced students this is on the whole not a difficult task, but Balzac's works abound in local, political and historical allusions, in peculiar idioms, and, when occasion requires, in what may be termed slang phrases, which the general reader often fails to understand, and thus loses a part of the force of many passages. As Prof. Harper justly says in his introduction: "These stories are not easy, on account of the immense

vocabulary employed; but there the difficulty ends, in the case of students who can follow the analytical thought, charmed by its depth and lured on by the fascination of exciting plots." The editors have rendered a great service to the student by giving in these selections copious notes explaining such allusions and phrases and adding thereby to the pleasure as well as the information of the reader.

Prof. Harper's introduction to the tales shows that he has himself been a careful and appreciative student of his author's style as well as of his life, and it contains a list of the best authorities for the life of Balzac, a short and suggestive sketch of his life, and discriminating mention of his most important productions.

It would be difficult to find an author better fitted to interest young students of French than Balzac. His shorter tales, six of which are here given, as well as his

larger novels, are marked by a graphic style, an abundance of adventure, and a subtlety of analysis which hold the attention and stimulate reflection, so that the labor of translation is forgotten in the interest of reading. Faithful in his pictures of French social life, a student of human nature and a close observer, Balzac seems almost to have created his characters, and yet many of those that seem almost beyond possibility, have their counterparts in real life. The supreme devotion of the injured wife in *La Cousine Bette* amazes us, but even Adeline Hulot becomes possible to us when we remember the accounts that appeared not long ago in the daily papers of the persistent and successful efforts of one woman to save from the gallows the husband who had robbed her of her money and abandoned her years before for another woman; or of that other childless wife, whose loving letters to her husband express tearful regret that she is not allowed to win back his affection by loving and caring for the child borne to him by another. The very strength of Balzac lies in the fact that we can find truth in his characters.

Balzac has another attraction for the sensitive reader. Realistic in a high degree, graphic in his delineation of every emotion, he paints human life in true colors without offending the reader, and herein differs widely from the acknowledged leader in the more modern realistic school, who mars some of his most touching tales by harrowing descriptions of brutality or vice which Balzac would have presented with equal force, but without exciting a resentful feeling toward the author himself.

It is related of Balzac that once in converse on social topics with friends he said, "Let us go back to real life; let us talk of Eugenie Grandet,"—perhaps his own fa-

vorite character. As Prof. Harper says, "Balzac led two lives, one of them among flesh and blood people, the other among characters no less real to him, the persons of his imagination. He dealt with them as conscientiously and with as much regard for consistency as if they had been real. When he formed an attachment to one of them he could hardly bear to let him go; and we find the same names recurring in book after book, though never in such a way as to produce confusion or necessitate a fixed order of reading."

The editors have made their selection with excellent judgment, presenting a series of tales which show Balzac in his various moods; even the fantastic and somewhat morbid tale, *Une Passion dans le Désert*, serving well as an example of writing somewhat akin to the stirring and fanciful longer story, *La Peau de Chagrin*.

The book makes a very useful addition to the resources of the teacher, while the value of the notes leads one to hope that similarly annotated works of the same author may be prepared by the same hands for the benefit of the general reader as well as the student. It is a pleasure to notice how well the publisher has done his part in the way of type and paper.

H. B. CORNWALL.

CONTES DE DAUDET, including "La Belle Nivernaise," edited, with introduction, notes and indices, by A. Guyot Cameron, Ph.D., assistant professor in the Sheffield Scientific School of Yale University. 12mo, pp. XXII, 302, Henry Holt & Co., 1893.

The finest and most characteristic work of Alphonse Daudet is in his short stories. Some of these are *nouvelles*, corresponding to the short story, which is the latest growth in contemporary English literature. The best of them, however, are *contes*, a variety of fiction much rarer and demand-

ing a higher degree of artistic ability. English literature is almost ignorant of the *conte*, properly and technically speaking. The subject of a *conte* should be so limited in time and action that it could find expression in verse almost if not altogether as well as in prose. Several of Bret Harte's shorter pieces are *contes*, and "Rab and his Friends" is one too, though somewhat more discursive than French rules would allow.

In France the type has been cultivated with such assiduity and intelligence, and so definitely developed, that an understanding eye can discern beneath the smooth finish of a *conte* by Daudet or Guy de Maupassant the rigor of artistic lines almost as distinct as those of a sonnet or a madrigal. The structural limitations of his art are undoubtedly stimulating to a poet. The men who, from Balzac to Daudet, have been establishing the canons of the *conte* have proved the same thing in prose, for there is more substance in some of these little pictures than in most English stories of twice their length. "Le Portefeuille de Bixiou," for example, in this edition, covers scarcely more than seven pages, and Guy de Maupassant's celebrated story "La Parure" is not much longer.

Most of the pieces in this excellent and welcome collection are *contes* in the technical sense. "La Belle Nivernaise" is a *nouvelle*, with a plot of considerable length and intricacy and moving more slowly over a greater period of time. Yet while this beautiful story adds to the usefulness of the book, it is the little sketches, the vivid, pathetic, and not easily forgotten *contes* which most impress the reader with a sense of power. For they are perfect in their kind—sudden and easy as awakening from sleep, round and satisfying as the horizon to a child. Daudet has mastered the difficult art of narrating an apparently

trivial happening so that its poetical significance shall be apparent and reproach us for never having felt that side of the matter before, which is just what Dr. John Brown does in "Rab and his Friends." After reading that story you look upon dogs in a new light; and no matter how much of a dog-lover you may have felt yourself before, you are sure to have a secret pain of conscience for never having understood them in just the way they deserved.

Furthermore, Daudet is an impressionist. And this is only saying that he makes you see the event with a certain atmosphere about it, and in a certain patch of colored landscape, through his eyes. And the eyes of an artist are those of a lover. They behold things not perhaps as they are when calmly scrutinized, but as they seem in a moment of heat and passion. It is related of St. Simon, the most fiery, impetuous, but withal artistic stylist of the French historians, that when he took off his wig his head was observed to smoke.

Daudet's passion is a love of his southern home and a desire to express it fully. It is this local quality, as distinct as a perfume, strong, heady, like thyme and mint, this smell of sunburnt Provençal dust, this vapor of a fiery elixir distilled from all the sweet and spicy herbs of Languedoc, with just a suggestion of garlic, which makes of Daudet's "Lettres de mon Moulin" the most beautiful book, the most poetical book, in recent French literature. It is a book, too, which no one but a Frenchman could have written, for perhaps not even the English language is so full of picture, so susceptible of delicate shading, as the French; and thus it is admirably adapted to the need of foreigners who wish to breathe a little of the subtle French spirit.

In Daudet's novels of Parisian life, in "Le Nabab," "L'Immortel," "Les Rois en

Exil," he had no such good chance to exercise his peculiar powers; so it is not in them that we find the real Daudet; so, too, it is not in them that we find a great master of fiction, a second Dumas, or a second Balzac. A man is a great artist only when he treats of what he loves. Robert Louis Stevenson is a great artist when he writes of Scotland. His American and other stories are brilliant *tours de force*. Bret Harte is at home only in California. And it is home-sickness to which we are indebted for that part of Daudet's work which he alone could have done. From "Lettres de mon Moulin," Professor Cameron has taken seven of the stories of his collection, adding to them several touching episodes of the war period. The introduction is sympathetic and likely to stimulate students to read those interesting books—"Trente Ans de Paris" and "Souvenirs d'un Homme de Lettres"—in which the Daudet brothers have told the story of their lives. Professor Cameron is to be commended also for adding a list of his author's works. The notes are precisely what notes should be. They give the setting to the stories and explain in an attractive, popular manner the obscurities of the text. For there are many things in the tales, so local are they and so thoroughly French, which would defy the penetration of any one who had never lived in France. The index of derivations is a novelty, and one for which every teacher will be grateful. There are four stories in "Lettres de mon Moulin" which it is to be hoped the editor will include in some future edition of his book. They have proved more successful with our Sophomores in Princeton than any other French stories. They are: "Les Etoiles," "Le Phare des Sanguinaires," "L'Agonic de la Sémillante," and "Le Poète Mistral."

It is a pleasant task to praise this conscientious piece of editing, for Professor Cameron, although he has been at Yale since 1891, is a Princeton man, having been graduated here in 1886, and having received here his master's and doctor's degrees. He is a frequent contributor to *Modern Language Notes*, in the January and February numbers of which, this year, he published a remarkable paper on "Tarabin and Tabarin," one of the curious side-issues of French literary history.

GEORGE MCLEAN HARPER.

"BASAL CONCEPTS IN PHILOSOPHY." By Prof. Alexander T. Ormond, Ph.D.

Prof. Ormond's philosophical work, recently published, presents much that is both original and suggestive, and which will tend to remove the reproach resting upon philosophy in many minds that it is merely a "meditation on death and annihilation." This book is an especially original contribution to philosophic discussion in the following three particulars, which seem of special worth and far-reaching significance:—A remodelling of Hegelism at points where its structural weakness is most apparent; the incorporating of the theological doctrine of the Logos as a constitutive part of his system; and, lastly, a statement of the theory of evolution, as the mode of the world-process, from a non-naturalistic point of view. There is a reasonable demand of every new system of philosophy that it be not too new. Continuity with the development of philosophic thought must not be broken; otherwise the proposed system is constructed in the air, and lacks historic ground basis. Prof. Ormond's philosophy coheres with Hegel's, and Hegel stands in the foremost files of time as the true historical representative and latest expression of a long-continued evo-

lution of philosophical principles, reaching back to Plato and the early beginnings of Greek philosophy. In his speculation, Prof. Ormond takes a position where he can feel beneath his feet the solid foundations of the past. And yet his point of departure from Hegel is a radical one, and this gives a distinctive coloring to his entire system. Hegel held that the primal opposites, being and non-being, could through a dialectic process pass from one into the other. The logical outcome of such a position is that the distinction between being and non-being vanishes. And hence it can not be explained how the relative can be generated from the absolute. Starting with the relative, how can you arrive at the absolute? or, starting with the absolute, how is it possible to reach the relative? If they are essentially the same, how can any difference exist? The only logical result is Pantheism. To escape these difficulties, Prof. Ormond posits three fundamental categories—being, non-being, and becoming. The concept of being is primarily that of an absolute conscious self-activity which manifests itself in the first instance as pure intellection. In this act, absolute being would cognize itself positively; and also, in a negative manner, would cognize the non-self, which is the second category of non-being. But, self-activity is likewise of the essence of absolute being; it must energize, for, to perceive the non-being, is in itself an impulse to absolute being, to go forth out of itself into the sphere of non-being in order to overcome the same through its own inherent energy. In this going forth, we have the third category, becoming. Absolute being, proceeding into the sphere of non-being, is compelled to adjust itself to the limitations of space and time, as well as all the other negative conditions which non-being

necessarily presents. The result is a relative, and not an absolute, order of things, *i.e.*, the present world-process; and with this characteristic, which is at the same time a restriction upon Hegelism, that the primal opposites, being and non-being, can never pass, the one into the other. This escapes the charge of Pantheism in all its forms; because it holds to the absolute nature of being, and yet to the essentially relative nature of becoming, which is the result of absolute being manifesting itself in the sphere of non-being. This avoids the difficulties of an absolute dualism.

Prof. Ormond's second contribution of special worth is his treatment of the evolutional process which is exhibited in the sphere of becoming. Absolute being manifesting itself in the sphere of non-being produces a relative order of things whose essential features are as follows: The beginnings of this manifestation must be in that portion of the sphere of non-being which is farthest removed from being; the phenomena and their laws thus emerging will be at first strictly mechanical, no unified coherence, but distinct forces combining in orderly collocations, but not at this stage in any organic way. There is a developement, however, towards a second stage, where the forces become organic and are dominated by an inner vital force which, by virtue of its own architectonic impulse, builds the purely mechanical phenomena into a living unity. Moreover, a third stage emerges which is marked by the rise of consciousness, in which the vital force becomes aware of itself, and appears as psychical. Throughout these processes, Prof. Ormond insists that the higher forms have been potentially present in the lower. In the mechanical stage the vital is always potential, and seeks to manifest itself ac-

cording to the law that potency ever tends towards actuality; and in the vital, the psychical is potential, and in a like manner, ever striving to realize itself in the process of evolution. Underlying these various manifestations, however, is the absolute being as the original and abiding world ground; and though never manifesting itself absolutely, yet ever proceeding from potency to actuality towards a complete self-realization. Evolution as thus restated by Prof. Ormond has a causal beginning which is the absolute being; and absolute being also is set forth as its teleological ideal. This removes the system far from all the forms of evolution which posit a naturalistic basis, and which proceed by a purely naturalistic law of development.

A third distinctive feature of Prof. Ormond's system is the prominence of the Logos doctrine. Though of primarily theological import and origin, he vindicates its independent philosophical significance. The Logos is the essential principle of absolute being which manifests itself as pure self-conscious personality. It is absolute being in its capacity of energizing; of going forth, as we have seen, to create the world in the sphere of non-being, and coming to an ever fuller manifestation through the stages of mechanism, life and spirit, and reaching its highest in man, of whose spiritual nature the Logos appears as the immanent principle. This principle is one of self-conscious personal activity; and, as in the nature of the absolute being there are three aspects of the personal life, namely, absolute thought, absolute will, and absolute love, so also in man the Logos-principle asserts itself intellectually in the principle of identity and difference, volitionally in the principle of sufficient reason, and aesthetically in the principle of unity, which is the soul of love.

Moreover, in the sphere of morals, distinctions of right and wrong arise from the immanent Logos furnishing a constant moral ideal in human consciousness. Moral evil, therefore, arises from the mutability of the nature of man, who as created being has his development under the category of the becoming, and therefore it naturally follows that the empirical will is at variance with the absolute character of the Logos ideal manifesting itself in man as conscience. Progress morally is where the latter dominates, and retrogression occurs whenever the empirical will chooses a course opposed to the dictates of the Logos principle within. The empirical will is subservient to mechanical categories. It is subject to the series which is characteristic of the world-stream, and so conditioned by the law of causal antecedence. The law of the ideal will, the manifestation of the Logos principle within, is that of free self-determination. Hence there must arise a moral evolution, which is but a phase of the larger evolution of the human soul in which the activity of mechanism passes into the freer activity of the spirit without being thereby suppressed or destroyed. The Logos, moreover, manifests itself in history, the abiding ground of communal nature, the source of the common consciousness of peoples, the inspiration of all substantial advance and progress. The Logos is the inspiration, too, of Art, so that in proportion as the Logos principle is manifested in artistic creation, absolute beauty is evolved. Lastly, it furnishes the basis for all religious life, man's communion and fellowship with the Absolute Spirit. The Logos principle is thus both the transcendent ground of man's personality, and likewise the immanent principle of his development. The Logos appears at the "supreme crisis in spiritual history as the ideal mediator and founder

of the universal religion of humanity. This ideal mediator is the incarnation of the consciousness of the Logos in which God is manifest, reconciling the world to himself." Thus the Logos principle, according to Prof. Ormond, becomes the unifying principle of all philosophical problemus.

JOHN GRIER HIBBEN.

CHAMPNEY'S HISTORY OF ENGLISH. Macmillan & Co. New York. 1893.

The fuller title of this work reveals its character and purpose—"A Sketch of the Origin and Development of the English Language," a work of recent date similar to that of an earlier period by Geo. P. Marsh on "The Origin and History of the English Language." In this treatise, the author is working along the same linguistic lines with Skeat in his "Principles of English Etymology," and Oliphant, in his "Old and Middle English" and "New English," aiming, however, to be less technical, and to meet a more general educational need. It is prepared, indeed, with primary reference to the demands of English philological teachers in this country and England, and is but an additional evidence of that intense and intelligent interest now taken in the study of advanced English on its linguistic side. Though the author tells us, "that his book does not profess to be more than an introduction to a large subject," it may be said to cover, in a general way, the extended province of the language, and thus lay the basis for any subsequent study that may be given it. The twenty-three different chapters might be said to discuss from various points of view four or five topics in the philology of English, such as—The Relations of English to other languages; The English Vocabulary, in its constituent elements; the various English Dialects of the older eras; the Historical Changes which the language has undergone, and

the special place of English in the Indo-European Group, and in the narrower Teutonic Group of Languages. Here is a spacious field of study, and the excellence of the work before us lies in the fact, that the ground is substantially covered by it without, at the same time, any diffuseness and superficiality. It is, thus, the best practical treatise extant on this special theme, and may be safely commended to those students in our colleges and universities who are looking for a discussion of the subject that is scholarly without being scholastic; definite without being technical, and that serves to stimulate the reader to a personal investigation of the topics treated. The maps which are inserted to illustrate Indo-European languages as now developed, and the English Dialects of the fourteenth century are especially helpful, while the various Selections from Old and Middle English serve to exhibit the structure and continuous expansion of the language down to the period of Modern English. No feature of the volume has interested us more than this one of unity and sequence, whereby English, in all its parts and periods, is presented as one and the same language, whether as found in Alfred's or Addison's prose. Opening with a discussion of our vernacular in its earliest forms, it suggestively closes with extracts from Thackeray and Macaulay and thus delineates the subject in its comprehensiveness and completeness. Herein, also, is discovered to us the present trend of English philological study toward unification and, therefore, toward simplicity and specific practical result.

Scarcely less important, also, is the proof which the treatise gives us that English Philology is becoming less and less dependent on Continental scholars for its interpretation and defense.

T. W. HUNT.

A CURIOSITY IN THE HISTORY OF ATHLETICS.

Richard Carewe of Antonie, Esquire, published in 1602 his book entitled "The Survey of Cornwall." The extract printed below is a remarkable one, as showing in how many points there is resemblance between the old English game of "Hurling to goales" and modern American college football.

HURLING TO GOALES.

For hurling to goales, there are 15, 20, or 30 players, more or lesse, chosen out on each side, who strip themselves into their slightest apparell, and then joine hands in ranke one against another. Out of these ranks they match themselves by payres, one embracing another, & so passe away: every of which couple are specially to watch one another during the play.

After this, they pitch two bushes in the ground, some eight or ten foote asunder; and directly against them, ten or twelve score off, other twayne in like distance, which they terme their Goales. One of these is appoynted by lots, to the one side, and the other to his adverse party. There is assigned for their gard, a couple of their best stopping Hurlers; the residue draw into the midst betweene both goales, where some indifferent person throweth up a ball, the which whosoever can catch, and cary through his adversaries goale, hath wonne the game. But therein consisteth one of Hercules his labours; for he that is once possessed of the ball, hath his contrary mate waiting at inches, and affraying to lay hold upon him. The other thrusteth him in the breast, with his closed fist, to keep him off; which they call Butting, and place in well doing the same, no small poynt of manhood.

If hee escape the first, another taketh him in hand, and so a third, neyther is

hee left, untill having met [as the Frenchman sayes] Chasseur a son pied, hee eyther touch the ground with some part of his bodie, in wrastling, or cry, Hold; which is the word of yielding. Then must he cast the ball [named Dealing] to some one of his fellowes, who catching the same in his hand, maketh away withall as before; and if his hap or agility bee so good, as to shake off or outrune his counter-wayters, at the goale, he findeth one or two fresh men, readie to receive and keepe him off. It is therefore a very disadvantageable match, or extraordinary accident, that leeseth many goales: howbeit, that side carryeth away best reputation, which giveth most falles in the hurling, keepeth the ball longest, and presseth his contrary neerest to their owne goale. Sometimes one chosen person on eche party dealeth the ball.

The Hurlers are bound to the observation of many lawes, as, that they must hurle man to man, and not two set upon one man at once: that the Hurler against the ball, must not *but*, nor hand-fast under girdle: that hee who hath the ball, must *but* onely in the others brest: that he must deal no Fore-ball, viz., he may not throw it to any of his mates, standing neerer the goale, than himselfe. Lastly, in dealing the ball, if any of the other part can catch it flying between, or e're the other have it fast, he thereby winneth the same to his side, which straightway of defendant becometh assailant, as the other, of assailant falls to defendant. The least breach of these lawes, the Hurlers take for a just cause of going together by the eares, but with their fists onely; neither doth any among them seek revenge for such wrongs or hurts, but at the like play againe.

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